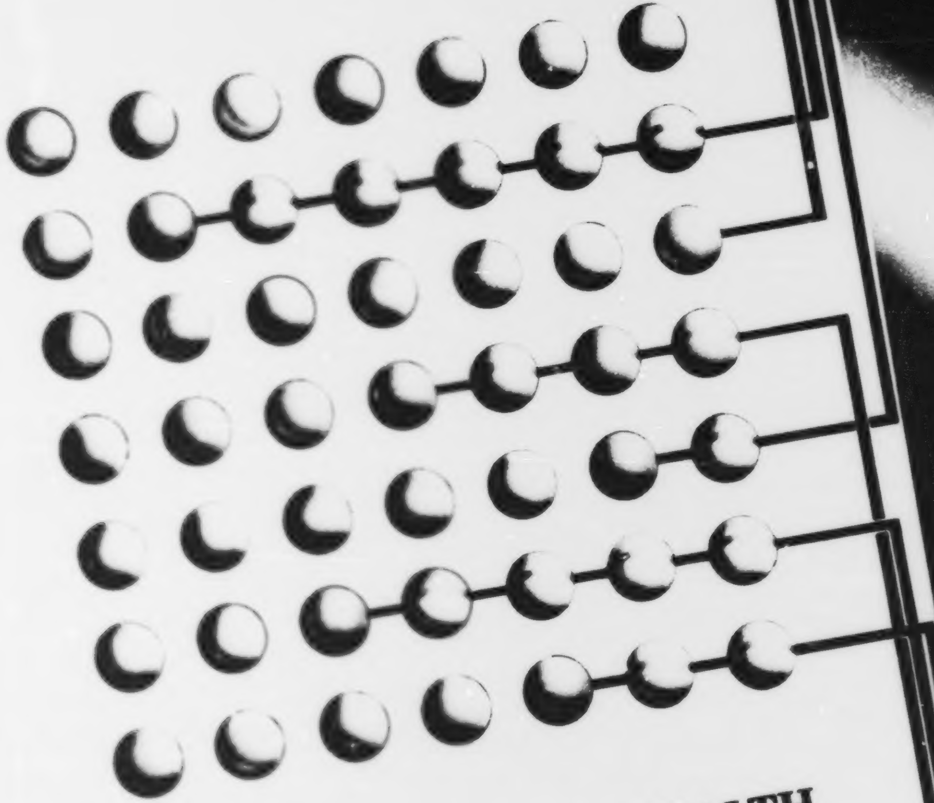

# AN INVENTORY OF HEALTH RESEARCH ON DRINKING WATER IN CANADA

Produced for:
Health and Welfare Canada
by:
FACE

85-5974/

# AN INVENTORY OF HEALTH RESEARCH ON DRINKING WATER IN CANADA

SPONSORED BY: ENVIRONMENTAL HEALTH DIRECTORATE
HEALTH PROTECTION BRANCH
HEALTH AND WELFARE CANADA

PREPARED BY: F.A.C.E.

# FOREWORD

I would like to thank the Environmental Health Directorate of Health and Welfare Canada for the foresight in contracting this Inventory.

I would like to thank Mr. Roy Hickman, Dr. Peter Toft and Dr. Richard Tobin specifically, for their work on this project.

It is a good first step in assembling what research we have been doing in this country on health affects and drinking water and should provide valuable data for what we have, what we need and where we go from here.

David Simpson, C.A.E.
Executive Director
F.A.C.E.

# TABLE OF CONTENTS

INTRODUCTION .................................. I

LIST OF RESEARCH PROJECTS .................... III

SOURCES OF INFORMATION ...................... IV

SAMPLE OF FORMAT ........................... V

INDIVIDUAL RESEARCH PROJECTS ................ 1-201

## INDICES

RESEARCHERS .......................... APPENDIX I

RESEARCH INSTITUTIONS ............... APPENDIX II

# INTRODUCTION

The following Inventory is an attempt to assemble some of the pertinent drinking water research in Canada under one cover.

Because of the diverse nature of water jurisdiction and the associated practical and applied research that is done in the various sectors, the research is presented and gathered in a standardized format but the level and type of research varies greatly.

In order to give as thorough a treatment as possible to this compendium, an independant survey of over 800 individuals and research institutions was undertaken along with data searches of the following water data banks:

- N.R.C. - Directory of Federally Supported Research in Universities
  - NRC publications
  - ELIAS - Environmental Libraries Automated System
  - CISTI - Can. Institute for Scientific and Technical Information
  - MICROLOG - Canadian Report Literature

-NHRDP - water projects

-National Library - AQUALINE - Water Resources Centre, England

-Environment Canada - WATDOC

-AWWA - WATERNET

The data is presented by PROJECT TITLE, and is indexed by 1) Researcher and 2) Research Institution. Each project is presented with:

TITLE
RESEARCHER(S)
INSTITUTION
ADDRESS
SOURCE (Data base name or survey)
BRIEF DESCRIPTION
FUNDING AMOUNT
FUNDING SOURCE
TIME FRAME

It is our hope that this research will form the basis for an assessment of what has been done to date in Canadian research on health effects of drinking water and act as a networking document for those doing research in the field.

# HEALTH RESEARCH ON DRINKING WATER IN CANADA

## RESEARCH PROJECTS

| TITLE | PAGE |
|---|---|
| A BACTERIOLOGICAL EVALUATION OF POINT-OF-USE ACTIVATED CARBON WATER FILTERS | 1 |
| A COMPARISON OF DYNAMIC AND STATIC HEAD SPACE AND SOLVENT EXTRACTION TECHNIQUES FOR THE DETERMINATON OF TH'MS IN WATER | 2 |
| A COMPREHENSIVE STUDY OF THE STATUS OF GREAT LAKES DRINKING WATER | 3 |
| A NATIONAL SURVEY FOR ASBESTOS FIBRES IN CANADIAN DRINKING WATER SUPPLIES | 4 |
| A NATIONAL SURVEY FOR CADIUM, CHROMIUM, COPPER, LEAD, ZINC, CALCIUM AND MAGNESIUM IN CANADIAN DRINKING WATER SUPPLIES | 5 |
| A NATIONAL SURVEY OF NITRILOTRIACETIC ACID IN CANADIAN DRINKING WATER | 6 |
| A NATIONAL SURVEY OF TRI(HALOALKYL)-, TRIALKYL-, TRIARYLPHOSPHATES IN CANADIAN DRINKING WATER | 7 |
| A STUDY OF HALOGEN LEVELS IN ASSINIBOINE RIVER EFFLUENTS IN THE BRANDON AREA | 8 |
| A STUDY OF THE EFFECTS OF FERTILIZER RUNOFF ON NITRATE AND PHOSPHATE LEVELS IN SURFACE WATER | 9 |
| A STUDY OF THE REMOVAL OF SYNTHETIC ORGANICS FROM DRINKING WATER | 10 |

A STUDY OF WATER QUALITY IN THE SOURIS RIVER 11

A WATER GRID FOR SOUTH WESTERN ONTARIO 12

ABSORPTION, DISTRIBUTION AND METABOLISM OF OF EPOXYSTEARIC ACID IN THE RAT 13

ACIDIC PRECIPITATION IN ONTARIO STUDIES (APIOS) 14

ADVANCED, FAST PROCESSES FOR PURIFYING WATERS POTABLE FUNCTIONS, ESPECIALLY IN FOOD PROCESSING 15

AIR DRIED CHEMICAL SEWAGE SLUDGE DISPOSAL ON AGRICULTURAL LAND, VOLUME 1 16

AMMONIUM PYRROLIDINEDITHIOCARBAMATE METHYL ISOBUTYL KETONE GRAPHITE FURNACE ATOMIC ABSORPTION FOR SOME TRACE MET. 17

AN ANALYSIS OF CANADIAN DRINKING WATER FLUORIDATION AND CANCER MORTALITY DATA 18

AN EVALUATION OF THE ORGANICS-CARBON ABSORBABLE METHODS FOR USE WITH POTABLE WATER 19

ANTIBIOTIC RESISTANT PLASMIDS IN BACTERIA ISOLATED FROM DRINKING WATER 20

APPROACHES FOR FORMULATING WATER QUALITY OBJECTIVES FOR THE SIMILKAMEEN RIVER 21

ASBESTOS AND DRINKING WATER IN CANADA 22

ASBESTOS FIBRES IN DRINKING WATER - A BIBLIOGRAPHIC STUDY 23

ASBESTOS IN DRINKING WATER 24

ASPECTS CHIMIQUES DU TRAITEMENT DES EAUX DE CONSOMMATION 25

ASSESSING THE EFFECTIVENESS OF SMALL FILTRATION SYSTEMS FPR POINT OF USE DISINFECTION OF DRINKING WATER SUPPLIES 26

ASSESSMENT OF SOME AQUEOUS RESIDUAL CHLORINE MEASUREMENTS 27

ASSOCIATION BETWEEN DRINKING WATER QUALITY AND DEATHS DUE TO HEART DISEASE IN ATLANTIC CANADA 28

BEHAVIOUR OF SIX MICRO-ORGANISMS IN COLD WATER 29

BIOLOGICAL EFFECTS OF WATER DRAWDOWN IN A MOUNTAIN POWER RESERVOIR IN KANANASKIS COUNTY 30

BIOMONITORING OF ORGANIC COMPOUNDS IN DRINKING WATER 31

CALCULATION OF THE CALCIUM-CARBONIC EQUILIBRIUM OF DRINKING WATER: COMPARISON OF TWO COMPUTERIZED METHODS 32

CHARACTERIZATION OF INDICATOR BACTERIA IN MUNICIPAL RAW WATER, DRINKING WATER, AND NEW MAIN WATER SUPPLIES 33

CHEMICAL CHARACTERISTICS OF SNOW IN THE YELLOWKNIFE AREA, N.W.T. 1975 34

CHEMCIAL COMPOSITION OF ICE CORE MELT WATERS 35

CHEMICAL CONTENT OF CANADIAN DRINKING WATER RELATED TO CARDIOVASCULAR HEALTH 36

CHEMICAL IDENTIFICATION AND BIOLOGICAL ASSAY STUDIES OF ENVIRONMENTAL MUTAGENS, PROMOTERS AND INHIBITORS 37

CHEMICAL QUALITY MUNICIPAL SUPPLIES PROVINCE OF NOVA SCOTIA 1978 38

CHRYSOTILE ASBESTOS FIBRE REMOVAL DURING POTABLE WATER TREATMENT - PILOT PLANT STUDIES 39

CLAY BARRIERS TO PREVENT GROUNDWATER CONTAMINATION 40

COLD TEMPERATURE WATER TREATMENT EVALUATION 41

COMBINED APPLICATION OF OZONE AND CHLORINE OR CHLORAMINE TO REDUCE PRODUCTION OF CHLORINATED ORGANICS IN WATER DISINFEC. 42

COMPARISON OF NINE BRANDS OF MEMBRANE FILTER AND THE MOST PROBABLE NUMBER METHODS FOR TOTAL COLIFORM ENUMERATION 43

COMPARISON OF TRIHALOMETHANE LEVELS AND OTHER WATER QUALITY PARAMETERS FOR THREE TREATMENT PLANTS ON THE OTTAWA RIVER 44

DETECTION OF GIARDIA LAMBLIA IN DRINKING WATER 45

DETERMINATION OF LEAD IN DRINKING WATERS BY HYDRIDE GENERATION AND ATOMIC ABSORPTION SPECTROSCOPY, AND 3 OTHER METHODS 46

DETERMINATION OF LOW NG PER LITRE LEVELS OF POLY-CHLORINATED BIPHENYLS IN DRINKING WATER 47

DETERMINATION OF MUTAGENIC POTENTIAL AND ORGANIC CONTAMINANTS OF GREAT LAKES DRINKING WATER 48

DETERMINATION OF TRACE ORGANICS COMPOUNDS IN CANADIAN COAL WASTEWATERS - PHASE III 49

DETERMINATION OF VOLATILE CONTAMINANTS AT THE NG/L LEVEL IN WATER BY CAPILLARY GAS CHROMATOGRAPHY WITH ELECTRON CAPTURE 50

DEVELOP. OF TECHNIQUES FOR THE DETECTION OF VERY LOW CONCENTRATIONS OF SULPHATE AND NITRATE IONS ON ICE CORE MELT WATER 51

DIHOACETONITRILES IN DRINKING WATER: ALGAE AND FULVIC ACIDS AS PRECURSORS 52

DIRECT DETERMINATION OF CADMIUM IN DRINKING WATER SUPPLIES BY GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROMETRY 53

DOCUMENTATION OF CORROSIVITY OF GROUNDWATER 54

EAU CONTAMINEE 55

EFFECT OF WATER SUPPLY AND SANITATION ON HEALTH OF PEOPLE (NORTHWEST TERRITORY, MANITOBA INDIAN RESERVES) 56

EFFECTIVENESS OF STREAM BUFFER ZONES DURING AERIAL APPLICATIONS OF CHLORIPHENOXY AND PICLORAM HERBICIDES 57

EFFECTS OF ACTIVATED CARBON AND BACTERIOSTATIC FILTERS ON MICROBIOLOGICAL QUALITY OF DRINKING WATER 58

EFFECTS OF ALUMINUM ON RESPIRATORY RESPONSES AND SPONTANEOUS ACTIVITY OF RAINBOW TROUT, SALMON GAIRDNERI 59

EFFECTS OF SAMPLING, SHIPPING AND STORAGE ON TOTAL ORGANIC CARBON LEVELS IN WATER SAMPLES 60

EFFICIENCY OF SEVERAL MICROFIBRE GLASS FILTERS FOR RECOVERY OF POLIOVIRUS FROM TAP WATER 61

ELECTRICAL KETTLES AS A SOURCE OF HUMAN LEAD EXPOSURE 62

ELIMINATION OF BACTERIA AND VIRUSES IN DRINKING WATER TREATMENT 63

ENTERIC VIRUSES IN RENOVATED WATER IN MANITOBA 64

ENVIRONMENTAL FATE MODELLING OF CHLORINATED DIOXINS 65

ENVIRONMENTAL PHOTOCHEMISTRY OF CHLORINATED AROMATIC POLLUTANTS (CAPs) IN AQUEOUS SYSTEMS 66

EPIDEMIOLOGY AND BIOLOGY OF GIARDIASIS 67

EROSION AND WATER QUALITY AFTER LOGGING IN THE OKANAGAN, B.C. 68

ETUDE DE FAISABILITE DE L'EVALUATION TOXICOLOGIQUE DES EAUX SOUTERRAINES BRUTES OU TRAITEES DE VILLE MERCIER 69

ETUDE DE LA COMPREHENSION DES PHENOMENES DE CONTAMINATION DES EAUX SOUTERRAINES AU QUEBEC PAR LES PESTICIDES 70

ETUDE PRELIMINAIRE SUR L'EFFECT D'UN MINERAI CONTENANT DES FIBRES D'AMIANTE COMME BALLAST SUR LA QUALITE DE L'EAU POTABLE 71

EVALUATION DE L'ELIMINATION DES VIRUS LORS DU TRAITEMENT CONVENTIONNEL DES EAUX USEES 72

EVALUATION VIROLOGIQUE DES EAUX POTABLES 73

FACTORS AFFECTING COLIFORM BACTERIAL GROWTH IN DISTRIBUTION SYSTEMS 74

FATE AND DEGRADATION OF CHLORINATED DIOXINS IN AQUATIC SYSTEMS 75

FLUORURES, FLUORURATION DE L'EAU ET QUALITE DE L'ENVIRONNEMENT 76

GIARDIASIS IN EDMONTON 77

GROUNDWATER VARIATIONS IN ARSENIC (III) AND ARSENIC (V) 78

GUIDELINES FOR SURFACE WATER QUALITY, VOL. I INORGANIC CHEMICAL SUBSTANCES, COPPER 79

HALOFORMS IN DRINKING WATER: A STUDY OF PRECURSORS AND PRECURSOR REMOVAL 80

HALOMETHANE STUDY: SELECTED SASKATCHEWAN WATER SUPPLIES 81

HEALTH EFFECTS OF DRINKING URANIUM-CONTAMINATED WATER 82

HEALTH EFFECTS OF LOW DOSES OF VIRUSES IN DRINKING WATER 83

HEALTH PRACTICES SURVEY 84

HEALTH STUDY OF WHITCHURCH-STOUFFVILLE - PROPOSAL 85

HOST RESERVOIRS OF GIARDIASIS 86

HUMAN INFECTIVITY OF GIARDIA IN ANIMAL HOSTS AND DRINKING WATER 87

HYDE PARK LANDFILL, NIAGARA FALLS, NEW YORK 88

INTERJURISDICTIONAL ISSUES IN CANADIAN WATER MANAGEMENT 89

INVESTIGATION OF TAINTED WATER, CITY OF EDMONTON WATER SUPPLY 90

INVESTIGATION OF THE PRESENCE OF AGRICULTURAL PESTICIDES IN THE LA SALLE AND ASSINIBOINE RIVERS, MANITOBA 91

IRRADIATION AS AN ALTERNATIVE FOR DISINFECTION OF DOMESTIC WASTE IN THE CANADIAN ARCTIC 92

LABORATORY TESTING OF POINT-OF-USE ULTRAVIOLET DRINKING WATER PURIFIERS 93

LAKE ONTARIO WATER CHEMISTRY ATLAS 94

LAKE WATER ACIDITY AND THE QUALITY OF PUMPED COTTAGE WATER IN SELECTED AREAS OF NORTHERN ONTARIO 95

LE PATRIMOINE DE DEMAIN 96

LINKING TRACE METALS WITH ASBESTOS FIBRES IN A RURAL ENVIRONMENT AFFECTED BY SERPENTINITIC SEDIMENTS 97

MANITOBA HYDRO THERMAL STUDY IN BRANDON 98

MEASUREMENT OF URANIUM AND THORIUM IN DRINKING WATER AND BOTTLED MINERAL WATERS 99

METAL IONS IN DRINKING WATER 100

METAL LOADINGS AND REMOVAL AT MUNICIPAL ACTIVATED SLUDGE PLANT 101

METAL SPECIATION IN ENVIRONMENTAL SAMPLES 102

METHODOLOGY DEVELOPMENT FOR GIARDIA ANALYSIS 103

MICROBIOLOGICAL QUALITY OF DRINKING WATER 104

MONITORING OF MARKET GARDEN PRODUCE 105

MUTAGENIC REACTION PRODUCTS OF AQUEOUS CHLORINATION OF CATECHOL. 106

MUTAGENICITY OF ORGANIC EXTRACTS FROM CANADIAN DRINKING WATER IN THE SALMONELLA/MAMMALIAN MICROSOME ASSAY 107

NATIONAL SURVEY FOR HALOMETHANES IN DRINKING WATER 108

NEMATODES FROM RIVER DRIFT AND SURFACE DRINKING WATER SUPPLIES IN SOUTHERN ONTARIO 109

NITRITES IN DRINKING WATER - STUDENT RESEARCH PROJECTS ANNUALLY AS PART OF CLASS/COURSE RQUIREMENT 110

ONGOING ASSESSMENT OF THE CHEMICAL QUALITY OF TORONTO'S DRINKING WATER 111

ON-SITE SAMPLING WITH PRECONCENTRATION FOR THE DETERMINATION OF SOME CHELEX-LABILE TRACE METALS IN DRINKING WATER 112

ORGANIC COLOR REMOVAL 113

ORGANOCHLORINE PESTICIDE LEVELS IN OTTAWA DRINKING WATER, 1976 114

PENDER HARBOUR SANITARY SURVEY - 1977 115

PERSISTANCE OF HUMAN ENTERIC BACTERIA IN THE CANADIAN NORTH 116

PESTICIDES/HERBICIDES AND ADJUVANTS IN DRINKING WATER 117

PILOT PLANT STUDIES TO EFFECT CHRYSOLTILE ASBESTOS FIBRE REDUCTION DURING POTABLE WATER TREATMENT 118

PILOT STUDIES IN THE USE OF OZONE FOR DOMESTIC WATER TREATMENT 119

PLATE COUNT METHODOLOGY FOR CHLORINATED DRINKING WATER SAMPLES 120

POLIOVIRUSES AS INDICATOR OF VIROLOGICAL QUALITY OF WATER 121

POLYCYCLIC AROMATIC HYDROCARBON LEVELS IN EASTERN ONTARIO DRINKGIN WATERS, 1978 122

POTABLE WATER PROTECTION IN DOMESTIC HOT WATER HEATING SYSTEMS 123

PRECHLORINATION AND TRIHALOMETHANE FORMATION AT WATER TREATMENT PLANTS 124

PREDICTION OF BIOLOGICAL AVAILABILITY OF ORGANIC CHEMICAL POLLUTANTS TO AQUATIC ANIMALS AND PLANTS 125

PRELIMINARY ENVIRONMENTAL STUDIES IN THE IRONDALE AREA 126

PRELIMINARY STUDIES ON THE LEACHING OF SOME TRACE METALS FROM KITCHEN FAUCETS 127

PRELIMINARY STUDY ON THE EFFECT OF AN ASBESTOS CONTAINING ORE USED AS A RAILROAD BALLAST ON THE QUALITY OF DRINKING WATER 128

PROPOSED: COMPARATIVE STUDY OF WATER QUALITY IN THE ELBOW AND BOW RIVER WATERSHEDS NEAR CALGARY, ALBERTA 129

QUALITE DE L'EAU D'ALIMENTATION A MONTREAL LONGUEUIL ET LEVIS 130

QUALITES PHYSICO-CHIMIQUES DE L'EAU DE ROUYN NORANDA 131

RADIOACTIVITY OF DRINKING WATER 132

RADIONUCLIDE LEVELS IN WELL WATER FROM THE LAC DU BONNET AREA OF MANITOBA 133

RADON AND RADON DAUGHTERS IN HOMES UTILIZING DEEP WELL WATER SUPPLIES, HALIFAX COUNTY, N.S. 134

RECHERCHE DE VIRUS DANS LES EAUX DE DISTRIBUTION GRACE A UNE NOUVELLE TECHNIQUE 135

RECHERCHE DE VIRUS ENTERIQUES HUMAINS DANS LES EAUX D'EGOUT 136

RECHERCHE DE VIRUS ENTERIQUES NON POLIOYELITIQUES DANS LES EAUX D'EGOUTS 137

RECREATIONAL AND DRINKING WATER MONITORING PROJECT 138

RECREATIONAL WATER QUALITY IN THE SOUTH PEACE HEALTH UNIT DISTRICT 139

REDUCTION OF HALOFORMS IN DRINKING WATER SUPPLIES 140

REGINA/MOOSE HAW DRINKING WATER QUALITY 141

RELATION BETWEEN TRACE ELEMENTS IN DRINKING WATER AND THE DIET AND DENTAL CARIES- A PILOT STUDY 142

RELATIONS AMONG POLLUTION INDICATOR BACTERIA ISOLATED FROM RAW WATER & DISTRIBUTION SYSTEMS BY THE PRESENCE/ABSENCE TEST 143

RELATIONSHIP BETWEEN WATER QUALITY AND DEATHS FROM CVD IN CANADA 144

RELATIONSHIPS BETWEEN RAW WATER QUALITY, TREATMENT, AND OCCURRENCE OF ORGANICS IN CANADIAN POTABLE WATER 145

REMOVAL OF ARSENIC FROM CONTAMINATED DRINKING WATER BY A CHITOSAN/CHITIN MIXTURE 146

REMOVAL OF ORGANICS IN WATER USING HYDROGEN PEROXIDE IN PRESENCE OF ULTRAVIOLET LIGHT 147

REMOVAL OF TRACE TOXIC ORGANICS IN A CONTAMINATED GROUNDWATER 148

RESERVOIR WATER QUALITY DETERIORATION 149

RESULTS OF THE TWO NATIONAL STUDIES OF THE Ca, Co, Cd, Cr, Cu, Mg, Ni, Pb, AND Zn CONTENTS OF DRINKING WATER IN CANADA 150

REVIEW OF MATERIALS IN CONTACT WITH POTABLE WATER AND TESTS FOR EVALUATION FOR UNSUSPECTED HEALTH HAZARDS 151

ROCKY CREST RESORT, LAKE JOSEPH, TWP OF HUMPHRIES HAMER BAY PARRY SOUND DISTRICT 152

S AREA LANDFILL, NIAGARA FALLS, NEW YORK 153

SOLUBLE AND SEDIMENT NITROGEN LOSSES AS RELATED TO LAND USE AND TYPE OF SOIL IN EASTERN CANADA 154

ST. CLAIR RIVER ORGANICS STUDY, IDENTIFICATION AND QUANTITATION OF ORGANIC COMPOUNDS 155

ST. PAUL TASTE AND ODOUR REMOVAL PROGRAM 156

STUDIES ON DETOXIFICATON OF PULP MILL EFFLUENTS 157

STUDIES OF MICROPOLLUTANTS 158

STUDY OF POTABLE WATER QUANTITY AND QUALITY DEFICIENCIES IN CANADIAN COMMUNITIES 159

STUDY OF THE TREATABILITY OF GROUND WATER CONTAMINATED BY TOXIC ORGANIC CHEMICALS IN THE VICINITY OF MERCIER TOWNSHIP 160

SUBCHRONIC STUDY OF A MIXTURE OF INORGANIC SUBSTANCES PRESENT IN THE GREAT LAKES ECOSYSTEM IN MALE AND FEMALE RATS 161

SUITABILITY OF THE MODIFIED FLUCTUATION ASSAY FOR EVALUATING THE MUTAGENICITY OF UNCONCENTRATED DRINKING WATER 162

SURFACE WATER CONTAMINATION FROM SANITARY LANDFILLS 163

SURVEY CHLORINATED PHENOLS IN FRASER RIVER ESTUARY 164

SURVEY OF NIAGARA AREA & SELECTED LAKE ONTARIO MUNICIPAL DRINKING WATER SUPPLIES 165

SURVEY OF NIAGARA AREA & SELECTED LAKE ONTARIO MUNICIPAL DRINKING WATER SUPPLIES 166

TALC CELITE LAYERS IN VIRUS RECOVERY FROM POTABLE WATERS EXPERIMENTALLY CONTAMINATED WITH FIELD ISOLATES AND SEWAGE 167

TAPWATER CONSUMPTION IN CANADA 168

TEMISKAMING DISTRICT SURFACE WATER MONITORING FOR CATIONS AND ANIONS 169

THE BOW RIVER WATER QUALITY IN TERMS OF ORGANIC COMPOUNDS 170

THE DANGER FROM ASBESTOS FIBRES IN POTABLE WATER 171

THE DETERMINATION OF POLYCYCLIC AROMATIC HYDROCARBONS AT THENG/L LEVEL IN OTTAWA TAPWATER 172

THE EFFECT OF WATER SUPPLY MANAGEMENT POLICIES ON FUTURE RISK OF SHORTAGES 173

THE EFFECTS OF NITROGEN OXIDES ON NATIVE VEGETATION, SOILS, AND WATER NEAR A COMPRESSOR INSTALLATION 174

THE OZONATION OF NATURAL WATERS: PRODUCT IDENTIFICATION 175

THE REMOVAL OF ORGANICS FROM DRINKING WATER BY OZONATION, BIODEGRADATION AND ACTIVATED CARBON ABSORPTION 176

TORONTO'S DRINKING WATER: A CHEMCIAL ASSESSMENT 177

TOWNSHIP OF TINY - ERIC PAUZE CONSTUCTION LTD. WASTE DISPOSAL SITE - HYDROGEOLOGIC STUDY 178

TOXIC COMPOUNDS IN POTABLE WATER AND SEWAGE PLANT EFFLUENTS 179

TOXIC EFFECTS OF LEAD AND LEAD COMPOUNDS ON HUMAN HEALTH, AQUATIC LIFE, WILDLIFE, PLANTS AND LIVESTOCK 180

TRIHALOMETHANE LEVELS IN CANADIAN DRINKING WATER 181

TRIHALOMETHANE REDUCTION DUE TO WATER TREATMENT PLANT OPTIMIZATION 182

TWIN BUTTE SOIL AND WATER EVALUATION 183

USE AND EFFECTS OF CHEMICAL COAGULANTS IN WATER AND WASTEWATER TREATMENT 184

USE OF AN ON SITE INTEGRATED PUMP SAMPLER FOR ESTIMATION OF TOTAL DAILY INTAKE OF SOME METALS FROM TAP WATER 185

USE OF TALC CELITE LAYERS IN THE CONCENTRATION OF ENTEROVIRUSES FROM LARGE VOLUMES OF POTABLE WATERS 186

USES OF OZONE IN DRINKING WATER FOR TREATMENT 187

VARIATIONS IN THE URANIUM AND RADIOACTIVITY LEVELS OF POTABLE SURFACE & GROUND WATER IN THE OKANAGAN AND W. KOOTENAY REGION 188

VERTICAL MOBILITY OF PESTICIDE RESIDUES IN IRRIGATED MANITOBA SOILS 189

VIRAL POLLUTION OF SURFACE WATERS DUE TO CHLORINATED PRIMARY EFFLUENTS 190

VIROLOGICAL EXAMINATION OF RAW AND FINISHED WATERS IN OTTAWA - HULL AND THE VICINITY 191

VIROLOGICAL SURVEY OF SELECTED DRINKING WATERS IN SOUTHERN ONTARIO 192

VIRUS MONITORING OF DRINKING WATER 193

VOLATILE ORGANIC COMPOUNDS IN WATER AT THIRTY CANADIAN POTABLE WATER TREATMENT FACILITIES 194

WATER DECHLORINATION BY ACTIVATED CARBON, ULTRAVIOLET RADIATION AND SOCIUM SULPHITE. A COMPARISON OF TREATMENT SYSTEMS 195

WATER DEMAND MANAGEMENT 196

WATER HARDNESS, HUMAN HEALTH AND THE IMPORTANCE OF MAGNESIUM 197

WATER QUALITY ANALYSIS OF NEARSHORE WATERS OF LAKE SIMCOE 198

WATER QUALITY OF THE BOW RIVER: THE CHEMICAL MASS-BALANCE AND DEPLETION FACTOR APPROACH 199

WELL WATER SURVEY, CARLETON AND MADAWASKA COUNTIES 200

WELLINGTON COUNTY WATER RESOURCE STUDY 201

## SOURCES OF INFORMATION

| | |
|---|---|
| SURVEY | FACE'S independent survey of over 800 individuals and research institutions. |
| AL | AQUALINE - International database providing access to information on every aspect of water, waste water and the aquatic environment. Water Resources Centre, England. |
| MICROLOG | Index and document delivery system providing access to current Canadian report literature of reference value from government and institutional sources. Micromedia Ltd. |
| WATDOC | Databases of the Inland Waters Directorate of Environment Canada. |
| IEC | Database of University based research projects as reported to the Information Exchange Centre (IEC) by granting agencies of the federal government. National Research Council Canada. |
| CISTI | Canadian Institute for Scientific and Technical Information. National Research Council Canada. |
| ELIAS | Environment Libraries Automated System. Environment Canada. |
| NHRDP | National Health Research and Development Program. Health and Welfare Canada. |

## SAMPLE OF FORMAT

HEALTH RESEARCH ON DRINKING WATER IN CANADA

*********************************************************************************************

PROJECT TITLE

RESEARCHER(S)

RESEARCH INSTITUTION

ADDRESS

SOURCE OF INFO.

BRIEF DESCRIPTION OF PROJECT

FUNDING AMOUNT

FUNDING SOURCE

DATES OF PROJECT

****************************************************************************************

## A BACTERIOLOGICAL EVALUATION OF POINT-OF-USE ACTIVATED CARBON WATER FILTERS

ROBERTSON, WILLIAM

N.S. RESEARCH

N.S. Research
Box 790, 100 Fenwick Street
Dartmouth N.S.
B2Y 3Z7

SURVEY

SP and TC counts were performed on filtered and non-filtered tapwater in four homes (2 chlorinated, 2 non-chlorinated) over a two month period. The basic objective was to determine if activated carbon filters installed in homes to filter tapwater are hazardous to human health.

$11,000.

Health and Welfare Canada

December/1981 - February/1982

**********************************************************************************

# A COMPARISON OF DYNAMIC AND STATIC HEAD SPACE AND SOLVENT EXTRACTION TECHNIQUES FOR THE DETERMINATION OF THM'S IN WATER

BOTHWELL, P.D. ; OTSON, R. ; WILLIAMS, D.T.

HEALTH AND WELFARE CANADA

Health and Welfare Canada

Ottawa Ontario

AL

Experiments were carried out to compare the suitability of three different techniques, namely the dynamic head space or gas sparging technique, the static head space technique and the solvent extraction technique for determining THM's in drinking water. The results are presented with tables and the authors recommend the solvent extraction technique as the most suitable for monitoring THM's in water because of its precision, relative accuracy, simplicity and speed.

N/ A

Health and Welfare Canada

1979

**********************************************************************************

A COMPREHENSIVE STUDY OF THE STATUS OF GREAT LAKES DRINKING WATER

BIERBRIER, ALLAN

CAN. PUBLIC HLTH. ASSOC.

C.P.H.A.
1335 Carling Ave. Suite 210
Ottawa, Ontario
K1Z 8N8

SURVEY

Evaluation of the effectiveness of current water treatment technologies, comparison of the quality of Canadian drinking water with current proposed standards, and consideration of the human health implications of Great Lakes drinking water.

$200,000.

H & W Canada, Ontario MOE

Summer 1984 - Summer 1985

**************************************************************************

A NATIONAL SURVEY FOR ASBESTOS FIBRES IN CANADIAN DRINKING WATER SUPPLIES

CHATFIELD, E.J. ; DILON, M.J.

HEALTH AND WELFARE CAN.

Health and Welfare Canada
Env. Health Directorate
Ottawa Ontario

MICROLOG

N.A.

Health and Welfare

1979

***********************************************************************************

# A NATIONAL SURVEY FOR CADMIUM, CHROMIUM, COPPER, LEAD, ZINC, CALCIUM AND MAGNESIUM IN CANADIAN DRINKING WATER SUPPLIES

SUBRAMANIAN, K.S. ; CHALIFOUX, C. ; MERANGER, J.C.

HEALTH AND WELFARE CANADA

Health and Welfare Canada

Ottawa Ontario

AL

Samples of raw, treated and distributed water obtained from 70 municipalities across Canada, were analysed by atomic absorption spectrometry. The concentrations of trace metals found were essentially the same for all three types of water samples. Contamination of the water supplies with these metals, except copper, was minimal during treatment and distribution. The levels of all were below WHO upper limit recommendations.

n/a

Health and Welfare Canada

1979

******************************************************************************************

## A NATIONAL SURVEY OF NITRILOTRIACETIC ACID IN CANADIAN DRINKING WATER

MALAIYANDI, M. ; WILLIAMS, D.T. ; O'GRADY, R.

HEALTH & WELFARE CAN

Health and Welfare Canada
Env. Health Directorate
Ottawa Ontario

WATDOC

The determination of nitrilotriacetic acid (NTA) using gas chromatography coupled with a nitrogen specific detector has been evaluated and applied to estimate the amounts of NTA in Canadian raw and potable waters. This study also compares the NTA concentrations in some of the major drainage basins in Canada.

N/A/

Health and Welfare Canada

1979

* * *

# A NATIONAL SURVEY OF TRI(HALOALKYL)-,TRIALKYL-, TRIARYLPHOSPHATES IN CANADIAN DRINKING WATER

LEBEL, G.L. ; WILLIAMS, D.T.

HEALTH AND WELFARE.

Health and Welfare Canada

Ottawa Ontario

AL

Potable water samples were obtained from 29 cities in Canada and analysed for tri(haloalkyl), trialkyl- and triaryl-phosphate. A comparison of triaryl phosphate levels with raw-water sources indicated that higher levels were found in potable water from rivers than lakes, and ground water had very low levels. The three central drainage basins of St. Lawrence River, Great Lakes an Winnipeg Lake had relatively high levels of triaryl phosphate.

?

Health and Welfare

1981

****************************************************************************************

## A STUDY OF HALOGEN LEVELS IN ASSINIBOINE RIVER EFFLUENTS IN THE BRANDON AREA

LETKEMAN, DR. PETER

BRANDON UNIVERSITY

Brandon University
Dept. of Chemistry
Brandon Manitoba
R7A 6A9

SURVEY

The project consists of a halide study of the Assiniboine River in the Brandon area. Data from southwestern Manitoba was also available to give a broader idea of the levels of the halides. From this study, a good indication of normal background levels of chloride, fluoride, and bromide was found. Hence the effects of industrial effluents on concentrations of these ions can be seen in the Brandon area.

$20,000.

Govt. of Canada

1971

******************************************************************************

A STUDY OF THE EFFECTS OF FERTILIZER RUNOFF ON NITRATE AND PHOSPHATE LEVELS IN SURFACE WATER

LETKEMAN, DR. PETER

BRANDON UNIVERSITY

Brandon University
Dept. of Chemistry
Brandon Manitoba
R7A 6A9

SURVEY

N/A

Govt. of Manitoba

1976

****************************************************************************

A STUDY OF THE REMOVAL OF SYNTHETIC ORGANICS FROM DRINKING WATER

BENEDEK, A.

MCMASTER UNIVERSITY

McMaster University
Dept. of Chemical Engineering
Hamilton Ontario

IEC

$24,373.

Supply and Services Canada

1976-77

********************************************************************************

A STUDY OF WATER QUALITY IN THE SOURIS RIVER

LETKEMAN, DR. PETER

BRANDON UNIVERSITY

Brandon University
Dept. of Chemistry
Brandon Manitoba
R7A 6A9

SURVEY

Monitoring of heavy metals in the Souris River along with such parameters as pH, hardness, turbidity, alkali and alkaline earth metals.

$15,000.

Govt. of Manitoba

1976

*************************************************************************

A WATER GRID FOR SOUTH WESTERN ONTARIO

PEARSON, DR. NORMAN

NORMAN PEARSON & ASSOC.

Norman Pearson & Associates
P.O. Box 5362, Station A
London Ontario
N6A 4L6

SURVEY

Macro planning overview of strategy for a water grid. Basic objectives were to determine, strategy and feasibility of a water grid; impact and consequences and regional development implications.

$150,000.

The Tanfield Group

Jan 1/84 - Dec 31/86

******************************************************************************

## ABSORPTION, DISTRIBUTION AND METABOLISM OF EPOXYSTEARIC ACID IN THE RAT

CHU, I. ; VILLENEUVE, D.C. ; SECOURS, V. VIAU, A.

HLTH. AND WELFARE CANADA

Health and Welfare Canada
Environmental Toxicology Div.
Ottawa Ontario

WATDOC

This study is part of a continuing program to assess the toxic potential of chemicals present as contaminants in pulp mill effluents. CIS-9, 1-0Epoxystearic Acid, Chlorinated Guaiacols and Resinous Acids are examples of such contaminants which have been found in river water and have been shown to be toxic to fish.

N/A

Health and Welfare Canada

1979

****************************************************************************

**ACIDIC PRECIPITATION IN ONTARIO STUDIES (APIOS)**

LYE, JOSEPH

ONT. MIN. OF ENVIRONMENT

Ont. Ministry of Environment
135 St. Clair Ave. W.
Toronto Ontario
M4V 1P5

SURVEY

The main objective of the APIOS is to determine the effects of acidic deposition on aquatic and terrestrial ecosystems. The study of drinking water supplies is being conducted under the APIOS. Basic objectives are 1. to determine the effects of acidic deposition on private, domestic drinking water supplies in Ontario. 2. to determine the extent to which acidic waters leach trace metals from plumbing systems.

$250,000 APPROX

Ont. Min. of Env.

July/1980 - September/1985

**************************************************************************************

ADVANCED, FAST PROCESSES FOR PURIFYING WATERS FOR POTABLE FUNCTIONS, ESPECIALLY IN FOOD PROCESSING

GALLOP, DR. R.A.

UNIVERSITY OF MANITOBA

University of Manitoba
Food Sciences Department
Winnipeg Manitoba
R3T 2N2

SURVEY

Optimal physiochemical methods, mostly involving advanced filtration processes, are being emphasized. Objective to develop very fast, reliable, efficient processes and equipment, to permit various grades of waters, to be purified as much as is necessary, to permit their immediate reuse, incl. for potable or higher functions.

$5,000.

U. of Manitoba

1984-85

*****************************************************************************

### AIR DRIED CHEMICAL SEWAGE SLUDGE DISPOSAL ON AGRICULTURAL LAND, VOLUME 1

BRYANT, D.N. ; COHEN, D.B.

DEPT. OF FISHERIES

Dept. of Fisheries

Ottawa Ontario

AL

The effects of substantial applications of heavy metals contained in air-dried sewage sludge on the response of soils and crops was investigated in a series of lysimeter experiments. Three different sludge types (alum, ferric chloride and lime treatment residues) were used at three different treatment levels on sandy or clay soils cropped with spring wheat.

N/A

Environment Canada

1978

*************************************************************************************

# AMMONIUM PYRROLIDINEDITHIOCARBAMATE METHYL ISOBUTYL KETONE GRAPHITE FURNACE ATOMIC ABSORPTION SYSTEM FOR SOME TRACE MET.

SUBRAMANIAN, K.S. ; MERANGER, J.C.

HLTH. AND WELFARE CANADA

Health and Welfare Canada

Ottawa Ontario

AL

A study was made to examine the feasibility of developing a simple and rapid procedure for single or simultaneous, extraction and determination of trace metals in raw, treated and distributed drinking waters. It is concluded from the results described with graphs and tables, that the ammonium pyrrolidinedithiocarbamate methyl isobutyl ketone graphite furnace atomic absorption system can be used for the determination of silver, cadmium, cobalt, chromium, copper, iron, manganese, nickel and lead

N/A

Health and Welfare Canada

1979

********************************************************************************

## AN ANALYSIS OF CANADIAN DRINKING WATER FLUORIDATION AND CANCER MORTALITY DATA

RAMAN, S. ; BECKING, G. ; GRIMARD, M. ; HICKMAN, J.R. ; MCCULLOUGH, R.S. ; TATE, R.A.

UNIVERSITY OF OTTAWA

University of Ottawa
Dept. of Epidemiology
Ottawa Ontario

WATDOC

A study encompassing seventy-nine groups of Municipalities throughout Canada, was undertaken to determine if fluoridation of water supplies enhances the risk of death from cancer for residents within those areas. The period covered was from 1954 to 1973 inclusive and comparisons for death rates from cancer were made between fluoridated and non-fluoridated municipality groups.

N/A

Health and Welfare Canada

1977

******************************************************************************

# AN EVALUATION OF THE ORGANICS-CARBON ADSORBABLE METHODS FOR USE WITH POTABLE WATER

OTSON, R. ; BOTHWELL, P.D. ; WILLIAMS, D.T.

HLTH. AND WELFARE CAN.

Health and Welfare Canada
Organic Chemistry Section
Ottawa Ontario

WATDOC

A lack of precision in some results obtained when Ottawa tap water was monitored for a one year period by the organics-carbon adsorbable method led to a detailed evaluation of the method. Although the use of glass rather than cellulose thimbles was found to minimize correction for thimble contamination, the authors conclude that the inherent drawbacks of the method limit its usefulness to special situations or to the collection of residues when identification of individual compounds is required.

N/A

Health and Welfare Canada

1979

*******************************************************************************

## ANTIBIOTIC RESISTANT PLASMIDS IN BACTERIA ISOLATED FROM DRINKING WATER

BEDARD, L. ; DRAPEAU, A.J. ; PLANTE, R. ; KASATIYA, S.S.

ECOLE POLYTECH. DE MTL.

Ecole Polytechnique de Mtl.

Montreal Quebec

AL

The authors have isolated 256 bacterial strains from water samples from 35 municipal drinking water supplies in Quebec and determined their patterns of resistance to antibiotics. The technique used was to mix the resistant bacteria with a strain of Esch. coli to evaluate the numbers of transferable, plasmidic resistance.

N/A

N/A

1982

*******************************************************************************

APPROACHES FOR FORMULATING WATER QUALITY OBJECTIVES FOR THE SIMILKAMEEN RIVER

SLAYMAKER, DR. O.

UNIVERSITY OF B.C.

University of B.C.
Geography Department
Vancouver B.C.
V6T 1W5

SURVEY

$3,600.

ENVIRONMENT CANADA

********************************************************************************

ASBESTOS AND DRINKING WATER IN CANADA

MERANGER, J.C. ; MAO, Y. ; TOFT, P. ; WIGLE, D.

HEALTH &WELFARE.

Health and Welfare

Ottawa Ontario

AL

Samples of raw and treated water supplies were collected from 71 municipalities in various parts of Canada and analysed for asbestos content by transmission electron microscopy. Chrysotile asbestos was identified as a major form present in drinking water, with some 5 per cent of public supplies containing asbestos at concentrations greater than 10 million fibres per litre. Concentration were reduced by up to 300-fold during treatment by coagulation and filtration.

N / A

Health and Welfare

1981

*****************************************************************************************

ASBESTOS FIBRES IN DRINKING WATER - A BIBLIOGRAPHIC STUDY

LOCUERY, DR. A.R.

UNIVERSITY OF WINNIPEG

University of Winnipeg
515 Portage Avenue
Winnipeg Manitoba
R3B 2E9

SURVEY

$3,000.

Federal Government

1981-82

******************************************************************************

## ASBESTOS IN DRINKING WATER

KAY, G.H.

MINISTRY OF ENVIRONMENT

Ministry of Environment
Pollution Control Branch
Toronto Ontario

WATDOC

Summarizes the results of analysis of water samples from 22 cities using surface water supplies. All samples showed asbestos contents. The range of concentrations was from about 0.3 to 3.87 million fibres per litre. Data is tabulated.

N/A

Environment Canada

1974

ASPECTS CHIMIQUES DU TRAITEMENT DES EAUX DE CONSOMMATION

BARBEAU, CLAUDE

UNIVERSITE LAVAL

Universite Laval
Centre de Recherches sur l'Eau
Quebec

CISTI

N/A

Universite Laval

1977

****************************************************************************************

## ASSESSING THE EFFECTIVENESS OF SMALL FILTRATION SYSTEMS FOR POINT OF USE DISINFECTION OF DRINKING WATER SUPPLIES

TOBIN, R.S. ; ARMSTRONG, V.C.

HEALTH AND WELFARE

Health and Welfare Canda
Env. Hlth Directorate
Ottawa Ontario

ELIAS

N.A.

Health and Welfare Canada

1980

************************************************************************************

## ASSESSMENT OF SOME AQUEOUS RESIDUAL CHLORINE MEASUREMENTS

OTSON, R. ; WILLIAMS, D.T.

HEALTH &WELFARE CANADA

Health and Welfare Canada

Ottawa Ontario

AL

Residual chlorine measurement methods, as applied by some Canadian collaborating companies, have been compared and residual chlorine values from stored water samples were assessed for use in correlation studies. Sodium hypochlorite solutions, filter effluents, plant effluent and tap water were analysed by the amperometric titration, residual chlorine electrode and DPD ferrous titrimetric methods for 0.2 to 2.0 ppm residual chlorine.

N/A

N/A

1980

************************************************************************

## ASSOCIATION BETWEEN DRINKING WATER QUALITY AND DEATHS DUE TO HEART DISEASE IN ATLANTIC CANADA

THIRUMURTHI, DR. D.

TECH. UNIVERSITY OF N.S.

Technical University of N.S.
Dept. of Civil Engrg. Box 1000
Halifax N.S.
B3J 2X4

SURVEY

A statistical survey of drinking water quality and death rates due to heart diseases, to establish a possible correlation between calcium and magnesium in tap water and death rates due to heart diseases in seven Atlantic Canadian cities.

$12,000.

NSERC/NRC/TUNS

January/1978 - March/1980

************************************************************************************

## BEHAVIOUR OF SIX MICRO-ORGANISMS IN COLD WATER

DRAPEAU, A.J. ; GOSSELIN, F.M. ; KASATIYA, S.S. ; LAURENCE, R.A.

MIN. DES AFF. SOCIALES/PQ

Ministere des Affaires

Quebec

AL

The authors have studied the survival, in water at pH 6 and 8, at temperatures 4, 10 and 20C, without nutrient, of Escherichia coli, Rhodotorula glutinis, Salmonella typhimurium, Pseudomonas aeruginosa, Yersinia enterocolitica and Shigella sonnei.

N/A

N/A

1980

****************************************************************************

BIOLOGICAL EFFECTS OF WATER DRAWDOWN IN A MOUNTAIN POWER RESERVOIR IN KANANASKIS COUNTRY

SEYMERS, B.H.

UNIVERSITY OF CALGARY

University of Calgary

Calgary Alberta
T2N 1N4

SURVEY

$ 30,000.

A.E.R.T. - ALTA. ENV. RESEARCH TRUST

FISCAL 1983-85

*******************************************************************************

BIOMONITORING OF ORGANIC COMPOUNDS IN DRINKING WATER

INT'L ENV. CONSULTANTS

International Env. Consultants

ELIAS

n/a

Ont. Min. of Environment

1981

********************************************************************************

# CALCULATION OF THE CALCIUM-CARBONIC EQUILIBRIUM OF DRINKING WATER: COMPARISON OF TWO COMPUTERIZED METHODS

PIRON,D. ; DESJARDINS,R. ; DUBUC, Y. ; BRIERE, F. ; LAFRANCE, P.

ADMIN. REG. DE KATIVIC

Admin. Regionale de Kativic

Montreal Quebec

AL

The iterative method of Legrand-Poirier is compared with the method developed by a research group at the Montreal Polytechnic, for computing the calco-carbonic equilibrium of drinking water. The Montreal method is based on the use of the generalized expression of Debye and Huckel to correct the values of dissociation constants. The computer programs resulting from both methods are presented and the results obtained compared.

N /A

N/A

1983

********************************************************************************

## CHARACTERIZATION OF INDICATOR BACTERIA IN MUNICIPAL RAW WATER, DRINKING WATER, AND NEW MAIN WATER SAMPLES.

SABATINOS, L.E. ; BURGER, C.A. ; CLARK, J.A.

MINISTRY OF ENVIRONMENT

Ministry of Environment

Toronto Ontario

AL

Water samples were analysed by membrane filter and presence-absence tests for pollution indicator bacteria. A brief methodology for the isolation and identification of the organisms is given. The 5 most commonly isolated species were Escherichia coli, Enterobacter cloacai, Aeromonas hydrophila, Klebsiella pneumoniae and Citrobacter freundii. Tables give isolation frequencies grouped by water source and water type. There was a small increase in the frequency of total coliforms...

?

Min. of Environment

1982

****************************************************************************

## CHEMICAL CHARACTERISTICS OF SNOW IN THE YELLOWKNIFE AREA, N.W.T. 1975

HAXRA, A.K. ; PROKOPUK, R. ; HARDIN, M.J.

ENVIRONMENT CANADA

Environment Canada
E.P.S. , Northwest Region
Edmonton, Alberta

WATDOC

As part of the Yellowknife Environmental Survey the E.P.S. conducted an investigation of the concentration and distribution of contaminating substances in snow during the winter of 1975. Both scoop and core snow samples were collected. The results indicate that the snow in the Yellowknife area does not conform to specifications for pH, lead, iron and manganese, under the Canadian Drinking Water Standards, 1968.

N/A

Environment Canada

1975

*************************************************************************************

CHEMICAL COMPOSITION OF ICE CORE MELT WATERS

PEAKE, E.

UNIVERSITY OF CALGARY

University of Calgary

Calgary Alberta
T2N 1N4

SURVEY

$8,000.

ENVIRONMENT CANADA

FISCAL 1983-85

CHEMICAL CONTENT OF CANADIAN DRINKING WATER RELATED TO CARDIOVASCULAR HEALTH

NERI, L.C. ; HOHANSEN, H.L. ; TALBOT, F.D.F.

UNIVERSITY OF OTTAWA

University of Ottawa

Ottawa Ontario

CISTI

N/A

University of Ottawa

1977

***********************************************************************************************

## CHEMICAL IDENTIFICATION AND BIOLOGICAL ASSAY STUDIES OF ENVIRONMENTAL MUTAGENS, PROMOTERS AND INHIBITORS

KATZ, DR. MORRIS

YORK UNIVERSITY

York University
Chemistry Dept., 127 Petrie
Downsview Ontario
M3J 1P3

SURVEY

Analysis of organic pollutants and invivo, invitro biological assays to determine mutagenic activity and study of potential inhibitors. Basic objectives to separate and quantitatively identify environmental pollutants in water samples from various public sources.

$460,000

Ont. M.O.E.

1981-1984

********************************************************************************

CHEMICAL QUALITY MUNICIPAL SUPPLIES PROVINCE OF NOVA SCOTIA 1978

N.S. DEPT. OF HEALTH

N.S. Dept. of Health
Public Health Engineering
Halifax N.S.

WATDOC

The Division of Public Health Engineering carries out an annual survey of the chemical quality of all drinking water supplies i the province. This is a summary of such a survey for 1978. This survey is undertaken to compare the differences in water quality between raw water and treated water as well as changes in water quality from year to year. Canadian Drinking Water Standards are also appended for reference.

N/A

N.S. Dept. of Health

1978

**********************************************************************************

CHRYSOTILE ASBESTOS FIBRE REMOVAL DURING POTABLE WATER TREATMENT - PILOT PLANT STUDIES

ROBERTS, K.J. ; LAWRENCE, J. ; ROBERTS, W.J. ; HUNSINGER, R.B.

N/A

AL

Pilot-plant studies are reported which incorporated the conventional potable water pre-treatment of coagulation, flocculation and sedimentation plus filtration, to assess chrysotile asbestiform - fibre removal. A subjective analysis of the results indicates that such conventional treatment can significantly lower chrysotile levels. Analytical methodology for chrysotile asbestos in water is often not sufficiently precise to detect concentration changes across unit.

N/ A

N/A

1980

******************************************************************************

## CLAY BARRIERS TO PREVENT GROUNDWATER CONTAMINATION

QUIGLEY, ROBERT M.

UNIVERSITY OF W. ONTARIO

University of Western Ontario
Faculty of Engineering
London Ontario
N6A 5B9

SURVEY

Field site domestic waste or clay, long term study of diffusion profiles; also hydraulic conductivity studies of organics in clays.

$ 80,000.

NSERC/M.O.E.

continuing

****************************************************************************************

COLD TEMPERATURE WATER TREATMENT EVALUATION

DAVID, E.

UNIVERSITY OF SASK.

University of Saskatchewan
Dept. of Civil Engineering
Saskatoon Sask.
S7N 0W0

SURVEY

Unit operations and processes of water treatment compared at summer (20C) and Winter (1C) temperatures. To determine efficiencies of operations and processes under winter conditions.

$15,000.

NSERC

April 1/84 - March 31/85

**************************************************************************

## COMBINED APPLICATION OF OZONE AND CHLORINE OR CHLORAMINE TO REDUCE PRODUCTION OF CHLORINATED ORGANICS IN WATER DISINFEC.

ODA, A. ; ROBERTSON, J.L.

IEC BEAK CONSULTANTS

I.E.C. Beak Consultants Ltd.

Mississauga Ontario

AL

The effectiveness of ozonation for the control of trihalomethanes (THM) and other halogenated compounds during the disinfection of drinking water was evaluated using municipal water from Lindsay, Ont. Pilot-scale water treatmt. systems were used to evaluate ozone application for the pre-disinfection step with chlorine or chloramine for the post-chlorination step and examined the influences of dissolved organic carbon concentrations, ozone dosage, time after chlorination and seasonal variation..

--

??

1983

********************************************************************************

# COMPARISON OF NINE BRANDS OF MEMBRANE FILTER AND THE MOST PROBABLE NUMBER METHODS FOR TOTAL COLIFORM ENUMERATION

TOBIN, R.S. ; LOMAX, P. ; KUSHNER, D.J.

HLTH. AND WELFARE CAN.

Health and Welfare Canada
Health Protection Branch
Ottawa Ontario
K1A 0L2

WATDOC

Nine different brands of membrane filter were compared in the membrane filtration method, and those with the highest yields were compared against the most-probable-number multiple-tube method for total coliform enumeration in simulated sewage contaminated tap water.

N.A.

Health and Welfare Canada

1980

********************************************************************************

## COMPARISON OF TRIHALOMETHANE LEVELS AND OTHER WATER QUALITY PARAMETERS FOR THREE TREATMENT PLANTS ON THE OTTAWA RIVER

BOTHWELL, P.D. ; OTSON, R. ; WILLIAMS, D.T. ; QUON, T.K.

DEGREMONT LAING LTD.

Degremont Laing Ltd.

AL

The results are reported of a 13 month survey of water quality in three potable water treatment systems using raw water from the Ottawa river. Two of the plants use coagulation and sedimentation, with rapid sand and anthracite filtration and the third uses a Pulsator clarifier and an Aquazor V filter in a Degremont system, as well as breakpoint chlorination. There were significant differences between the water quality parameters in the third plant particularly with regard to chlorform levels.

N/A

Health and Welfare Canada

1981

***************************************************************************************

DETECTION OF GIARDIA LAMBLIA IN DRINKING WATER

ISAAC-RENTON, J.L.

UNIVERSITY OF B.C.

University of B.C.
Department of Pathology
Vancouver B.C.
V6T 1W5

SURVEY

$20,600.

B.C. HEALTH CARE RESEARCH FOUNDATION

****************************************************************************************

DETERMINATION OF LEAD IN DRINKING WATERS BY HYDRIDE GENERATION AND ATOMIC ABSORPTION SPECTROSCOPY, AND 3 OTHER METHODS.

VIJAN, P.N. ; SADANA, R.S.

N/A

AL

Simultaneous presence of nickel and copper in potable waters interferes with the determination of lead by the hydride/atomic absorption spectrophotometric method. A rapid procedure is reported for co-- precipitation of lead with hydrated oxides of manganese, and the results obtained by differential pulse anodic stripping voltammetry, flame atomic absorption and graphite furnace atomic absorption spectrophotometry are compared.

N/A

N/A

1980

********************************************************************************

# DETERMINATION OF LOW NG PER LITRE LEVELS OF POLYCHLORINATED BIPHENYLS IN DRINKING WATER

WILLIAMS, D.T. ; LEBEL, G.L.

HEALTH AND WELFARE

Health and Welfare Canada

Ottawa, Ontario

AL

A number of Aroclor formulations have been analysed in well water and river water drinking water sources, using Amberlite XAD-2 macroreticular resin sampling cartridges, clean up on a Florisil column and gas chromatography with electron capture detection.

N/A

Health and Welfare Canada

1980

**********************************************************************************

## DETERMINATION OF MUTAGENIC POTENTIAL AND ORGANIC CONTAMINANTS OF GREAT LAKES DRINKING WATER

NESTMANN, E.R. ; BENOIT, F.M. ; LEBEL, G.L. ; OTSON, R. ; WILLIAMS, D.T. ; LEE, E.G.H.

HEALTH AND WELFARE CAN.

Health and Welfare Canada

Ottawa Ontario

AL

Extracts of water supplies for 12 communities in Canada obtaining water from the Great Lakes were analysed for the presence of organochlorine pesticides, polyaromatic hydrocarbons, organophosphorus pesticides, and trialkylarylphosphates, and were also assessed for their potential mutagenicity. The results are summarized in tables and graphs, and discussed.

??

Health and Welfare Canada

1982

******************************************************************************

DETERMINATION OF TRACE ORGANIC COMPOUNDS IN CANADIAN COAL WASTEWATERS - PHASE III

ATWATER, DR. J.W.

UNIVERSITY OF BC

University of B.C.
Civil Engineering
Vancouver B.C.
V6T 1W5

SURVEY

$6,832.00

D.S.S.: ENVIRONMENT CANADA

****************************************************************************************

# DETERMINATION OF VOLATILE CONTAMINANTS AT THE NG/L LEVEL IN WATER BY CAPILLARY GAS CHROMATOGRAPHY WITH ELECTRON CAPTURE

COMBA, M.E. ; KAISER, K.L.E.

CAN. CEN. FOR INLAND WAT

Canada Centre for Inland Water

Burlington Ontario
L7R 4A6

AL

Samples of groundwater and drinking water were collected and analysed for volatile contaminants. The headspace collection technique - a vacuum distillation with cryogenic trapping of chromatography with electron capture detection. Recovery values are tabulated and comparisons made with detection limits obtained using other analytical techniques.The headspace technique is simple, inexpensive with good sensitivity and is also applicable to the analyses of haloforms and associated halomethanes...

N/A

Canada Centre for Inland Waters

1983

***************************************************************************************

DEVELOP. OF TECHNIQUES FOR THE DETECTION OF VERY LOW CONCENTRATIONS OF SULPHATE AND NITRATE IONS ON ICE CORE MELT WATER

PEAKE, E.

UNIVERSITY OF CALGARY

University of Calgary

Calgary Alberta
T2N 1N4

SURVEY

$5,000.

ENVIRONMENT CANADA

FISCAL 1983-85

****************************************************************************************************

# DIHALOACETONITRILES IN DRINKING WATER: ALGAE AND FULVIC ACIDS AS PRECURSORS

OLIVER, B.G.

CAN. CEN. FOR INLAND WAT.

Canada Centre for Inland Water

Burlington Ontario

AL

Samples of chlorinated drinking water from various areas of Ontario were found to contain dihaloacetonitriles, in amount equal to about 10 per cent of the average concentration of trihalomethanes. All the samples contained dichloracentonitrile and some contained dibromoacetonitrile. Experiments showed that these compounds could be produced during chlorination of water containing fulvic acid and two species of algae.

N / A

N / A

1983

****************************************************************************************

# DIRECT DETERMINATION OF CADMIUM IN DRINKING WATER SUPPLIES BY GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROMETRY

MERANGER, J.C. ; SUBRAMANIAN, K.S.

HLTH AND WELFARE CAN.

Health and Welfare Canada

Ottawa Ontario

WATDOC

The feasibility of using direct heated graphite atomic absorption as a rapid screening technique for the direct analysis of cadmiumin raw, treated and distributed drinking water is demonstrated. Data are presented on the determination of cadmium using four different approaches: direct analysis, standard addition, ammonium pyrrolidinedithiocarbamate-methyl isobutyl Ketone extraction, and matrix modification involving precoating of the graphite tube with lanthanum nitrate.

N/A

Health and Welfare Canada

1979

*********************************************************************************

DOCUMENTATION OF CORROSIVITY OF GROUNDWATER

SHAW, W.J.D.

UNIVERSITY OF CALGARY

University of Calgary

Calgary Alberta
T2N 1N4

SURVEY

$ 30,000.00

A.E.R.T. - ALTA. ENV. RESEARCH TRUST

FISCAL 1983-85

*********************************************************************************

EAU CONTAMINEE

NORMANDIN , LUCIE

C.L.S.C. LAC ETCHEMIN

C.L.S.C. Lac Etchemin
197 - 3rd Avenue
Lac Etchemin Quebec
G0R 1S0

SURVEY

Etude exhaustive de la problematique de l'eau contaminee sur le territoire de CLSC Lac-Etchemin

NIL

N/A

March/81 - April/81

********************************************************************************

## EFFECT OF WATER SUPPLY AND SANITATION ON HEALTH OF PEOPLE (NORTHWEST TERRITORY, MANITOBA INDIAN RESERVES.)

HEINKE, G.W.

UNIVERSITY OF TORONTO

University of Toronto
Dept. of Civil Engineering
Toronto Ontario
M5S 1A4

SURVEY

An ongoing study relating to health data on water based diseases to water quantity/quality and sanitation facilities, to provide decision makeres with better information to allocate scarce resources for improvement of water supply and sanitation facilities in Canada's northern communities.

$ 40,000/YEAR

NSERC/ D.I.A.N.D./ H&W/Govt. of NWT

1983 - ongoing

******************************************************************************

## EFFECTIVENESS OF STREAM BUFFER ZONES DURING AERIAL APPLICATIONS OF CHLOROPHENOXY AND PICLORAM HERBICIDES

WILSON, D.M. ; WAN, M.T.K.

ENVIRONMENT CANADA.

Environment Canada
E.P.S. Pacific Region
Vancouver B.C.

WATDOC

The effectiveness of 150 foot buffer zones to protect stream bankside integrity and water quality was determined during aerial applications of chlorophenoxy and piclora herbicides to control hardwoods in conifer plantations and in powerline rights-of-way.

N/A

Environment Canada

1975

***************************************************************************

## EFFECTS OF ACTIVATED CARBON AND BACTERIOSTATIC FILTERS ON MICROBIOLOGICAL QUALITY OF DRINKING WATER

SMITH, D.K. ; TOBIN, R.S. ; LINDSAY, J.A.

HEALTH AND WELFARE

Health and Welfare Canada

Ottawa Ontario

AL

Laboratory and field studies were made of three activated carbon filters to observe their effects on the quality of drinking water. The results, reported with tables and a graph, suggest that activated carbon filters are susceptible to colonization by bacteria, in varying degrees, and indicate that such filters, used without post-treatment disinfection, have adverse effects on the microbiological quality of water, and pose a potential health hazard.

N /A

Health and Welfare Canada

1981

******************************************************************************

# EFFECTS OF ALUMINUM ON RESPIRATORY RESPONSES AND SPONTANEOUS ACTIVITY OF RAINBOW TROUT, SALMO GAIRDNERI

OGILVIE, D.M. ; STECHEY, D.M.

UNIVERSITY OF W. ONTARIO

University of Western Ontario

London Ontario

AL

Opercular rate and cough frequency were increased in juvenile trout after 26 hours exposure to dechlorinated tap water containing 50, 100, 200 or 500 ug aluminum per litre. The cough frequency response was dose related with a threshold concentration of approximately 100 ug aluminum per litre. Unlike opercular rate the cough rate did not appear to be altered by handling stress on transfer to the observation tank.

--

?

1983

******************************************************************************

# EFFECTS OF SAMPLING, SHIPPING AND STORAGE ON TOTAL ORGANIC CARBON LEVELS IN WATER SAMPLES.

BOTHWELL, P.D. ; OTSON, R. ; WILLIAMS, D.T. ; MCCULLOUGH, R.S. ; TATE, R.A.

HEALTH AND WELFARE CANADA

Health and Welfare Canada

Ottawa, Ontario

AL

A study was made of the effects of sampling, shipping and storage on the total organic carbon (TOC) levels of water samples containing from 400g to 7500g organic carbon per litre. The sampling, storage, and shipping methods used by the authors had little effect on TOC levels in tap water and river water samples, and it is concluded that water samples from distant sources can be satisfactorily shipped to a central laboratory for reliable TOC determination.

N/A/

N/A

1979

****************************************************************************************

# EFFICIENCY OF SEVERAL MICROFIBRE GLASS FILTERS FOR RECOVERY OF POLIOVIRUS FROM TAP WATER

PAYMENT, P. ; TRUDEL, M.

INSTITUT ARMAND FRAPPIER

Institut Armand-Frappier
531 boul. des Prairies
Laval des Rapides Quebec
H7N 3X7

AL

The virus adsorbancy, flow rate, clogging resistance and virus concentration efficiency of several microfibre glass filters have been compared with those of Millipore membrane filters using tap water a 2 nephelometric turbidity units. When tested on poliovirus type 1, only those filters with low nominal porosity showed adequate adsorption. Filters with high adsorbancy tended to clog and have low flow rates. A combination of a microfibre glass pre filter and a cartridge filter was efficient.

N/A

N/A

1979

**************************************************************************************

ELECTRIC KETTLES AS A SOURCE OF HUMAN LEAD EXPOSURE

CHARLEBOIS, E.J. ; WIGLE, D.T.

HEALTH AND WELFARE CANADA

Health and Welfare Canada
Lab Centre for Disease Control
Ottawa Ontario
K1A 0L2

AL

A survey was performed of the lead content of water boiled in electric kettles in 574 households, to evaluate the possible hazards of lead poisoning from this source. Blood-lead levels in persons aged 6 and over could not be correlated with lead concentration in boiled water, or weekly intake from this source.

N /A

Health and Welfare Canada

1978

********************************************************************************

# ELIMINATION OF BACTERIA AND VIRUSES IN DRINKING WATER TREATMENT

PAYMENT, P. ; PLANTE, R. ; TRUDEL, M.

UNIVERSITE DU QUEBEC

Universite du Quebec

Ville de Laval Que.

AL

A bi-weekly sampling and bacterial/virological analysis programme at five drinking water plants in Quebec, is reported. Although the raw water quality at four of the plants was poor, none of the finished waters contained viruses or indications of faecal pollution. The treatment system which appeared to be most effective in reducing the microbial pollution load was pre-chlorination, coagulation, sedimentation which reduced faecal bacteria to about 100 per litre.

--

?

1983

************************************************************************

## ENTERIC VIRUSES IN RENOVATED WATER IN MANITOBA

SEKLA, L. ; STACKIW, W. ; KAY, C. ; VANBUCKENHOUT, L.

CADHAM PROV. LAB.

Cadham Prov. Lab
770 Bannatyne Ave.
Winnipeg Manitoba
R3C 3Y1

WATDOC

Using various concentration procedures (including the gauze pad method, ultrafiltration and adsorption-elution), enteric viruses, mainly vaccine strains of polioviruses, were isolated from 61.8% of sewage, 20.5% of effluents, 3% of river water and 6.7 % of drinking water samples collected from a waterway system in Manitoba. The presence of polioviruses in the drinking water of the town utilizing this waterway was not correlated with an increase in the number of infectious diseases reported.

N/A

N/A

1980

*****************************************************************************

## ENVIRONMENTAL FATE MODELLING OF CHLORINATED DIOXINS

WEBSTER, G.R. BARRIE

UNIVERSITY OF MANITOBA

University of Manitoba
Pesticide Research Laboratory
Winnipeg Manitoba
R3T 2N2

SURVEY

Determination of physical constants for chlorinated dioxins enables use of mathematical models to predict their fate in aquatic systems. Basic objectives: to determine physical constants of chlorinated dioxins, to compare ability of several environmental fate models to predict aquatic fate, to predict environmental fate of chlorinated dioxins in aquatic systems.

$195,000.

Canadian Wildlife Service

October/1982 - July/1985

****************************************************************************************

## ENVIRONMENTAL PHOTOCHEMISTRY OF CHLORINATED AROMATIC POLLUTANTS (CAPs) IN AQUEOUS SYSTEMS

CHOUDHRY, G.G.

UNIVERSITY OF MANITOBA

University of Manitoba
Pesticide Research Laboratory
Winnipeg Manitoba
R3T 2N2

SURVEY

Study of the degradation of chlorobenzenes, chlorophenols, chlorodiphenyl ethers, chlorodioxins, and chlorodibenzofurans in aqueous solutions under simulated sunlight, to determine the extent of photochemical breakdown of (CAPs) in aquatic systems; to determine the quantum yields for these processes.

$40,000.

Canadian Wildlife Service

October/1983 - July/1985

*************************************************************************

## EPIDEMIOLOGY AND BIOLOGY OF GIARDIASIS

LEWIS, P.D.

UNIVERSITY OF LETHBRIDGE

University of Lethbridge
Dept. of Biological Sciences
Lethbridge Alberta
T1K 3M4

SURVEY

Time course of Giardia lamblia infections in animal models; evidence that dogs may serve as monitors of waterborne transmission to provide early warning of human outbreaks. Objectives: 1) Monitor cyst passage & troph levels in gerbils during primary infections & recrudescences triggered by immunodepression. 2) Compare prevalence of infection in dogs before & during the occurrence of a human outbreak. 3) Determine if Flagyl-cured gerbils show recrudescence following post-cure immunodepression.

--

Alta. Env. Research Trust

completion in 1986

********************************************************************************

EROSION AND WATER QUALITY AFTER LOGGING IN THE OKANAGAN, B.C.

GOLDING, DR. D.L.

UNIVERSITY OF B. C.

University of B.C.
Forest Resources Mgmt. Branch
Vancouver B.C.
V6T 1W5

SURVEY

$11,816.00

B.C. Dept. of Environment

******************************************************************************

ETUDE DE FAISABILITE DE L'EVALUATION TOXICOLOGIQUE DES EAUX SOUTERRAINES BRUTES OU TRAITEES DE VILLE MERCIER

SYLVESTRE, MICHEL

Institut Armand Frappier

Institut Armand Frappier
531 boul. des Prairies
Laval-des-Rapides Que.
H7V 1B7

SURVEY

-Synthese de litterature et de l'avancement des recherches de laboratoire.
-Recommandation de combinaison de bioessais a effectuer pour evaluer la potabilite des eaux contaminees par des substances toxiques organiques. Recherche des tests ou analyses biologiques ou biochimiques (bioessai) pour evaluer la toxicite a moyen et a long terme (effets mutagenes, cancerigene, teratogene) d'une eau potable.

$28,000.

Environnement Quebec

March 1985 - Sept. 1985

****************************************************************************

## ETUDE DE LA COMPREHENSION DES PHENOMENES DE CONTAMINATION DES EAUX SOUTERRAINES AU QUEBEC PAR LES PESTICIDES

VILLENEUVE, JEAN-PIERRE

INRS-Eau

INRS-Eau
2-700 rue Einstein
Ste-Foy Que.
G1V 4C7

SURVEY

Synthese de litterature et de l'avancement des recherches. -Processus physiques, chimiques et biochimiques entre le sous- sol et les pesticides; modele mathematique. -Etablir un guide pour inventorier des zones potentielles de contamination de l'eau souterraine par les pesticides. -Preparer une strategie d'intervention en cas de contamination.

$20,000.

Environnement Quebec

April 1984 - March 1985

*************************************************************************

ETUDE PRELIMINAIRE SUR L'EFFET D'UN MINERAI CONTENANT DES FIBRES D'AMIANTE COMME BALLAST SUR LA QUALITE DE L'EAU POTABLE

MERANGER, J.C. ; DAVEY, A.B.C.

HEALTH AND WELFARE CANADA

Health and Welfare Canada

Ottawa Ontario
K1A 0L2

ELIAS

N.A.

Health and Welfare Canada

1980

******************************************************************************

EVALUATION DE L'ELIMINATION DES VIRUS LORS DU TRAITEMENT CONVENTIONNEL DES EAUX USEES

PAYMENT, PIERRE

INSTITUT ARMAND FRAPPIER

Institut Armand Frappier
531 boul. des Prairies
Laval des Rapides Quebec
H7N 3X7

NHRDP

$77,194.

N.H.R.D.P.

1982 - 1985

*******************************************************************************

EVALUATION VIROLOGIQUE DES EAUX POTABLES

PAYMENT, PIERRE

INSTITUT ARMAND FRAPPIER

Institut Armand Frappier
531 boul. des Prairies
Laval des Rapides Quebec
H7N 3X7

NHRDP

$80,000.

N.H.R.D.P.

1980-1982

## FACTORS AFFECTING COLIFORM BACTERIAL GROWTH IN DISTRIBUTION SYSTEMS

MARTIN, R.S. ; GATES, W.H. ; TOBIN, R.S. ; GRANTHAM, D. ; SUMARAH, R. ; WOLFE, P. ; FORESTALL, P.

VICTORIA GENERAL HOSPITAL

Victoria General Hospital
Laboratory Division
Halifax, N.S.

WATDOC

Lab studies were carried out to determine which factors influence the survival and growth of coliforms, particularly Kiebsiella pneumoniae, in drinking water distribution systems. Tubercle material scraped from the lumen of distribution pipes adversely affected the maintenance of a free available chlorine residual and supported K. Pneumoniae growth.

N/A

Health and Welfare Canada

1982

*******************************************************************************

## FATE AND DEGRADATION OF CHLORINATED DIOXINS IN AQUATIC SYSTEMS

WEBSTER, G.R. BARRIE

UNIVERSITY OF MANITOBA

University of Manitoba
Pesticide Research Laboratory
Winnipeg Manitoba
R3T 2N2

SURVEY

A study of fate and degradation of selected chlorinated dioxins in artificial ponds and enclosures in lakes, to determine the rate of loss and ultimate fate of selected chlorinated dioxins; to validate environmental fate modelling work on chlorinated dioxins.

$165,000.

NSERC

November/1984 - October 1987

****************************************************************************

FLUORURES, FLUORURATION DE L'EAU ET QUALITE DE L'ENVIRONNEMENT

BUNDOCK, J.B.; GRAHAM, J.R.; MORIN, P.J.

CLSC LOTBINIERE-OUEST

CLSC Lotbiniere-Ouest
Fortierville,
CTE. Lotbiniere Quebec
G0S 1J0

SURVEY

"Fluoruration de l'eau et Qualite de l'Environnement" has been published in english by the Pennsylvania Academy of Sciences, in a book entitled, "Solid and Liquid Wastes Management, Methods and Socioeconomic Considerations" c/o Dr. S.K. Majumdar, Department of Biology, Lafayette College, Easton, Pennsylvania, 18042.

N/A

Ministere de l'Environnement, Quebec

N/A

****************************************************************************

GIARDIASIS IN EDMONTON

KING COLLIER, MARGARET

EDM. LOCAL BOARD OF HLTH.

Edmonton Local Board of Health
Suite 500, 10216-124th Street
Edmonton Alberta
T5N 4A3

SURVEY

Epidemiological investigation of an outbreak of giardiasis in Edmonton, Alberta. Basic objective is to document the outbreak and to investigate factors associated with the development of the disease.

N/A

Edmonton Local Board of Health

January/1983 - October/1983

****************************************************************************************

## GROUNDWATER VARIATIONS IN ARSENIC (III) AND ARSENIC (V)

MCCURDY, DR. R.F.

DALHOUSIE UNIVERSITY

Dalhousie University
Faculty of Medicine
Halifax N.S.
B3H 4H6

SURVEY

Measurement of variations in arsenic species at four stations for one year, and examination of factors affecting variations. Basic objectives were to develop methodologies for measurement of forms of arsenic , to describe stability of collected samples, to describe temporal variations in arsenic species, to study factors that might influence physiochemical behavior of AS in water.

n/a

TUNS/N.S. Dept. of Hlth./Dalhousie U.

January/1979 - September/80

********************************************************************************

GUIDELINES FOR SURFACE WATER QUALITY, VOL. I INORGANIC CHEMICAL SUBSTANCES,
COPPER

DEMAYO, A; TAYLOR, M.C.

INLAND WATER DIRECTORATE

Inland Waters Directorate
Environment Canada
Ottawa Ontario

SURVEY

A literature survey was carried out on the toxic effects of copper and copper compounds on human health, aquatic life, plants and livestock. The information is summarized in this publication. from it, maximum copper concentrations in water at which toxic effects will not appear are recommended.

1981

****************************************************************************

# HALOFORMS IN DRINKING WATER: A STUDY OF PRECURSORS AND PRECURSOR REMOVAL

LAWRENCE, J. ; OLIVER, B.G.

CAN. CEN. FOR INLAND WAT.

Canada Centre for Inland Water

Burlington Ontario

AL

An account is given of a study on the reaction of chlorine with several natural water samples and with some of the more abundant organics present in natural waters to try and identify haloform precursors. Humic substances, present in high concentrations in most surface waters are shown to be the major haloform precursors; the situation with methyl ketones is less certain. Alum treatment, followed by sand filtration, removed about two-thirds of the precursors from the raw water samples.

N/A

Environment Canada

1979

******************************************************************************************

HALOMETHANE STUDY: SELECTED SASKATCHEWAN WATER SUPPLIES

FAST, D.A. ; MCDONALD, R.A.

PROV. OF SASKATCHEWAN

Province of Saskatchewan
Water Pollution Control Branch
Regina Saskatchewan

MICROLOG

N/A

Province of Saskatchewan

1978

**************************************************************************

## HEALTH EFFECTS OF DRINKING URANIUM-CONTAMINATED WATER

MOSS, DR. M. ; MCCURDY, DR. R.

DALHOUSIE UNIVERSITY

Dalhousie University
Department of Pathology
Halifax N.S.
B3H 4H6

SURVEY

The basic objectives of the study were to define the threshold for toxicity and in so doing to develop sound criteria for safe drinking water.

N/A

Dalhousie University

project is ongoing

****************************************************************************************

HEALTH EFFECTS OF LOW DOSES OF VIRUSES IN DRINKING WATER

PAYMENT, PIERRE

INST. ARMAND FRAPPIER

C.P. 100
Laval des Rapides
Laval Quebec
H7N 4Z3

SURVEY

Lab and epidemiological studies to determine minimal infective and pathogenic doses of enteric viruses.

--

H&W,CRSNG,M.O.E.(QUE.)

PROJECT IS ONGOING

HEALTH PRACTICES SURVEY

ABERNATHY, T.

CALGARY HEALTH SERVICES

Calgary Health Services
Box 4016, Station C
Calgary Alberta
T2T 5T1

SURVEY

To determine health status and behaviours of the Calgary population (including drinking water).

$20,000.

Calgary Health Services

Feb. 1/85 - Mar. 31/85

*************************************************************************************

HEALTH STUDY OF WHITCHURCH-STOUFFVILLE - PROPOSAL

STEELE, ROBERT ; LEES, RONALD E.

QUEEN'S UNIVERSITY

Queen's University
Dept. of Comm. Hlth & Epidem.
Kingston Ontario
K7L 2N6

SURVEY

In 1982 a feasibility study was undertaken. The Ministry of Health did not agree with the proposal or method of study and are in the process of designing an alternate study. The basic objective was to determine if toxic chemicals were leaching out of Site #4 of WMI's garbage dump and contaminating local wells. Also to try and determine any long term health effects of residents.

N/A

Pub. Hlth Br., York/Min. of Hlth, Ont.

February/1983

**************************************************************************************

## HOST RESERVOIRS OF GIARDIASIS

WALLIS, P.M.

KANANASKIS CENTRE

Kananaskis Centre
University of Calgary
Calgary Alberta
T2N 1N4

SURVEY

Identification of Giardia cysts in animal stools. A census of Giardiasis in wild and domestic animals. The detection of animal reservoirs of human infective Giardia and of cysts in water supplies with particular reference to outdoor recreation areas.

$30,000.

Alberta Environmental Research Trust

April 1/84 - March 31/85

************************************************************************************

HUMAN INFECTIVITY OF GIARDIA IN ANIMAL HOSTS AND DRINKING WATER

WALLIS, P.M.

UNIVERSITY OF CALGARY

University of Calgary

Calgary Alberta
T2N 1N4

SURVEY

$ 42,063.

ENVIRONMENT CANADA

FISCAL 1983-85

**************************************************************************

HYDE PARK LANDFILL, NIAGARA FALLS, NEW YORK

ANDERSON, GRANT

GARTNER LEE ASSOC. LTD.

Gartner Lee Assoc. Ltd.
Toronto-Buttonville Airport
Markham Ontario
L3P 3J9

SURVEY

Hydrogeochemical impact assessment of organic chemical migration from an abandoned chemical dump site. Identify potential environmental impacts and assess the adequacy of proposed survey studies and remedial technologies.

Environment Canada

1981 - ongoing

******************************************************************************

INTERJURISDICTIONAL ISSUES IN CANADIAN WATER MANAGEMENT

HUNT, C.D.

UNIVERSITY OF CALGARY

University of Calgary
Department of Law
Calgary Alberta
T2N 1N4

SURVEY

$14,000.

ENVIRONMENT CANADA

FISCAL 1983-85

INVESTIGATION OF TAINTED WATER, CITY OF EDMONTON WATER SUPPLY

PROVINCE OF ALBERTA

Province of Alberta
Pollution Control Division
Edmonton Alberta

MICROLOG

N/A

Province of Alberta

1979

********************************************************************************

## INVESTIGATION OF THE PRESENCE OF AGRICULTURAL PESTICIDES IN THE LA SALLE AND ASSINIBOINE RIVERS, MANITOBA

WILLIAMSON, D.A.

MANITOBA ENVIRONMENT

Manitoba Environment
Box 7, Bldg. 2, 139 Tuxedo Ave
Winnipeg Manitoba
R3N 0H6

SURVEY

Pesticide residues are being measured in water, bottom sediments, aquatic plants and aquaitc animal tissues. To determine the extent of contamination by agricultural pesticides. The Assiniboine River is presently used for domestic supply. The La Salle River is being considered as a future source for municipal domestic supply.

April 1983 - April 1985

****************************************************************************

INVESTIGATION OF TAINTED WATER, CITY OF EDMONTON WATER SUPPLY

PROVINCE OF ALBERTA

Province of Alberta
Pollution Control Division
Edmonton Alberta

MICROLOG

N/A

Province of Alberta

1979

* * *

# INVESTIGATION OF THE PRESENCE OF AGRICULTURAL PESTICIDES IN THE LA SALLE AND ASSINIBOINE RIVERS, MANITOBA

WILLIAMSON, D.A.

MANITOBA ENVIRONMENT

Manitoba Environment
Box 7, Bldg. 2, 139 Tuxedo Ave
Winnipeg Manitoba
R3N 0H6

SURVEY

Pesticide residues are being measured in water, bottom sediments, aquatic plants and aquaitc animal tissues. To determine the extent of contamination by agricultural pesticides. The Assiniboine River is presently used for domestic supply. The La Salle River is being considered as a future source for municipal domestic supply.

April 1983 - April 1985

# IRRADIATION AS AN ALTERNATIVE FOR DISINFECTION OF DOMESTIC WASTE IN THE CANADIAN ARCTIC

I.E.C. INT. ENV. CONS.

IEC Int. Env. Consultants Ltd.

Islington Ontario

WATDOC

The purpose of this study was to evaluate the technical and economic feasibility of various methods for disinfecting wastewater in the Canadian Arctic with specific reference to gamma radiation. More conventional disinfection practices, such as chlorination, chlorination-dechlorination, and ozonation were compared to gamma radiation along with ultraviolet (UV) irradiation and lime (pH) disinfection.

N/A

Canadian Mortgage and Housing

1981

**************************************************************************************

LABORATORY TESTING OF POINT-OF-USE ULTRAVIOLET DRINKING WATER PURIFIERS

TOBIN, R.S.

HEALTH AND WELFARE CANADA

Health and Welfare Canada

Ottawa Ontario

ELIAS

N.A.

Health and Welfare

1979

****************************************************************************************

LAKE ONTARIO WATER CHEMISTRY ATLAS

DOBSON, HUGH F.H.

NAT. WATER RES. INSTITUTE

National Water Research Instit
867 Lakeshore Road
Burlington Ontario
L7R 4A6

SURVEY

This is an 18 year study assessing the results of phosphorus loading control, to study the nutrient related aspects of Lake Ontario, especially long term trends.....particulate organic matter especially lipids, collect some contaminants and thereby protect the drinking water which is filtered.
Publication: Inland Waters Directorate Scientific Series No. 139.

CANADA DEPT. OF ENVIRONMENT

1966-1984

********************************************************************************

## LAKE WATER ACIDITY AND THE QUALITY OF PUMPED COTTAGE WATER IN SELECTED AREAS OF NORTHERN ONTARIO

VAIRO, C. ; KHAN, T.R. ; MERANGER, J.C. ; LI, W.C. ; JACKSON, R.

HEALTH AND WELFARE

Health and Welfare Canada

Ottawa Ontario

AL

Detailed tabulated results are presented from studies on metals in the drinking water of dwellings near three lakes in Ontario sensitive to the effects of acid precipitation. It was found that lead, copper, cadmium and zinc were all leached form the plumbing systems in significant amounts ; copper and lead were leached mainly from copper piping, while zinc and cadmium originated from galvanized steel pressure tanks. The concentrations of lead and copper were affected by the duration of contact

--

Health and Welfare Canada

1983

****************************************************************************

LE PATRIMOINE DE DEMAIN

DUFOUR, JULES

Universite du Quebec

Doyen des Etudes de Premier C.
Universite du Quebec a Chicout
Chicoutimi Que.
G7H 2B1

SURVEY

Etablissement d'une strategie d'utilisation et de conservation des ressources naturelles pour l'an 2000. Introduire des pratiques generales de conservation au Quebec.

$50,000.

Parcs Canada et Autres

Mars 1984 - Decembre 1985

*************************************************************************************

LINKING TRACE METALS WITH ASBESTOS FIBRES IN A RURAL ENVIRONMENT AFFECTED BY SERPENTINITIC SEDIMENTS

SCHREIER, H.

UNIVERSITY OF B. C.

University of B.C.
Department of Soil Science
Vancouver B.C.
V6T 2A2

SURVEY

Asbestos fibres are introduced to the Sumas River by a landslide and this results in high trace metal values in the water. The impact of high levels of asbestos fibres and trace metals on the aquatic and terrestrial environment is examined. Biological uptake was determined using terrestrial animals.

$28,000.00

NRC, ENVIRONMENT SECRETARIATE

AUGUST 1982 - DECEMBER 1984

***************************************************************************

MANITOBA HYDRO THERMAL STUDY IN BRANDON

LETKEMAN, PETER ; DELMAGE, MARK

BRANDON UNIVERSITY

Brandon University
Department of Chemistry
Brandon Manitoba
R7A 6A9

SURVEY

Some physical and chemical effects of the Brandon Generating Station on the Assiniboine River during periods of high electrical generation and relatively low river flow were investigated.

$9,000.

Manitoba Hydro

1974-77

******************************************************************************

MEASUREMENT OF URANIUM AND THORIUM IN DRINKING WATER AND BOTTLED MINERAL WATERS

ZIKOVSKY, L. ; GALINIER, J.L.

ECOLE POLYTECH. DE MTL.

Ecole Polytechnique de Mtl.

Montreal Quebec

AL

Trace levels of uranium and thorium in 20 drinking waters, from North America and Europe, and 18 bottled waters available in Quebec have been studied by neutron activation analysis. Induced activities were measured by ganna-ray spectrometry using two types of solid-state detectors. The characteristics of the two detectors are discussed.

N/A

N/A

1981

**************************************************************************************

METAL IONS IN DRINKING WATER

SMITH-PALMER, DR. T.

ST. FRANCIS XAVIER UNIV.

St. Francis Xavier University

Antigonish N.S.
B2G 1C0

SURVEY

Studies of total Al in town drinking water as a function of pH; use of fast equilibrium dialysis to assist in determining the speciation of metals. Basic objectives were to develop methods whereby we can quickly analyse for certain metallic species of interest, to use these methods to look at certain water supplies.

varies

NSERC/St. F.X.U.

varies

*******************************************************************************

## METAL LOADINGS AND REMOVAL AT MUNICIPAL ACTIVATED SLUDGE PLANT

NIELSEN, J.S. ; HRUDEY, S.E.

UNIVERSITY OF ALBERTA

University of Alberta

Edmonton Alberta

AL

Tabulated and graphical data are given on the concentrations of heavy metals in the influent and effluent at a sewage works at Edmonton, Alta. using the plug flow activated sludge process. There were marked diurnal variations in metal concentrations and influent flows. Removal efficiencies for cadmium, chromium, and copper were high, but those for nickel and zinc were variable ad generally low. Metal concentrations in the final effluent were below the max. concentrations permitted...

--

?

1983

**********************************************************************

METAL SPECIATION IN ENVIRONMENTAL SAMPLES

VANLOON, JON C.

UNIVERSITY OF TORONTO

University of Toronto
Institute for Env. Studies
Toronto Ontario
M5S 1A1

SURVEY

Chromatography is used with atomic absorption and emission detectors to determine the forms of trace metals. Objectives: to develop methods for determining the forms of trace metals (70% of work) and to use the methods for analysing environmental samples (30% of work)

N/A

NSERC and M.O.E.

continuing

************************************************************************************

## METHODOLOGY DEVELOPMENT FOR GIARDIA ANALYSIS

WALLIS, P.M.

KANANASKIS CENTRE

Kananaskis Centre
University of Calgary
Calgary Alberta
T2N 1N4

SURVEY

Improving methodology for cyst detection and identification of human pathogenicity. Culturing, straining and filtration methods development for wild strains of giardia - also immunological methods for the detection of human infective specifications.

$30,000.00

Alberta Environment

Jan 1/84 - March 31/85

MICROBIOLOGICAL QUALITY OF DRINKING WATER

CAN. PUB. HLTH. ASSOC.

Canadian Public Health Assoc.
1335 Carling Ave. Suite 210
Ottawa Ontario

ELIAS

N.A.

Health and Welfare Canada

1977

*************************************************************************************

MONITORING OF MARKET GARDEN PRODUCE

WEST, ROY

SASKATCHEWAN HEALTH

Provincial Epidemiologist
3475 Albert Street
Regina Saskatchewan
S4S 6X6

SURVEY

Monitoring bacterial content of garden produce irrigated with water into which treated city wastes have been discharged to determine whether bacterial content is a health threat.

N/A

Saskatchewan Health

Summer 1984 - ongoing

******************************************************************************

## MUTAGENIC REACTION PRODUCTS OF AQUEOUS CHLORINATION OF CATECHOL.

NAZAR, M.A. ; RAPSON, W.H. ; TARHANEN, J. ; BROOK, M.A., ; MAY, S.

UNIVERSITY OF TORONTO

University of Toronto

Toronto Ontario

AL

Aqueous chlorination under acidic conditions of catechol ( a simple model compound) produced a high frequency of mutagenicity with Ames Salmonella strain TA100, which was maximal at three equivalents of chlorine per mole of cetechol. Use of chlorine dioxide, instead of chlorine, resulted in little mutagenicity.

?

?

1981

**************************************************************************************

# MUTAGENICITY OF ORGANIC EXTRACTS FROM CANADIAN DRINKING WATER IN THE SALMONELLA/MAMMALIAN MICROSOME ASSAY

WILLIAMS, D.T. ; LEBEL, G.L. ; KOWBEL, D.J. ; NESTMANN, E.R.

HEALTH AND WELFARE.

Health and Welfare Canada

Ottawa Ontario

AL

The Salmonella/mammalian microsome histadine assay has been used to show that organic extracts of chlorinated Ontario drinking water induce mutation and can be lethal. Salmonella typhimurium strains were used and the mutagenicity patterns were different for the five locations assayed and appeared to be seasonally variable, autumn samples being the most mutagenic and lethal.

?

Health and Welfare Canada

1979

******************************************************************************

NATIONAL SURVEY FOR HALOMETHANES IN DRINKING WATER

HEALTH AND WELFARE.

Health and Welfare Canada
Health Protection Branch
Ottawa Ontario

WATDOC

A national survey for halomethanes in drinking water was carried out in seventy Canadian municipalities. The objectives of th survey were to determine halomethane levels in drinking water supplies across Canada and to relate these levels, if possible, to the type of raw water supply, water treatment and total organic content.

N/A

Health and Welfare Canada

1977

**********************************************************************************

# NEMATODES FROM RIVER DRIFT AND SURFACE DRINKING WATER SUPPLIES IN SOUTHERN ONTARIO

MOTT, J.B. ; HARRISON, A.D.

TEXAS A&M UNIVERSITY

Texas A&M University

College Station Texas

AL

Geographic location: Delhi, Cayuga, Brantford, Ontario. Sixty-six genera of nematodes were collected over 13 months from treated and untreated water from water treatmt. plants in southern Ontario. Only a few genera were present in abundance and nearly all the genera in untreated water were also found in the treated water at the three plants; over 50% of the specimens were still motile. Most nematodes in surface waters were considered to originate from the soil or aquatic habitats.

?

?

1983

****************************************************************************

NITRITES IN DRINKING WATER - STUDENT RESEARCH PROJECTS ANNUALLY AS PART OF CLASS/COURSE REQUIREMENT

B.C. INSTITUTE OF TECH.

B.C. Institute of Technology
3700 Willingdon Avenue
Burnaby B.C.
V5G 3H2

SURVEY

N/A

N/A

1985

************************************************************************************

## ONGOING ASSESSMENT OF THE CHEMICAL QUALITY OF TORONTO'S DRINKING WATER

DAVIES, DR. K.

DEPT. OF PUBLIC HLTH, TOR

Department of Public Health
559 Jarvis street
Toronto Ontario
M4Y 2J1

SURVEY

Trends in the chemical quality of Toronto's water are evaluated on an ongoing basis, and the relevance of chemical contaminants for human health is being assessed, to determine the potential health effects, if any, of Toronto's drinking water.

N/A

N/A

January/1983 - ongoing

*****************************************************************************

# ON-SITE SAMPLING WITH PRECONCENTRATION FOR THE DETERMINATION OF SOME CHELEX-LABILE TRACE METALS IN DRINKING WATER

LANGFORD, C.H. ; SUBRAMANIAN, K.S. ; MERANGER, J.C. ; ALLEN, C.

HEALTH AND WELFARE

Health and Welfare Canada

Ottawa Ontario

AL

An on-site pump-integrated water sampler coupled with a Chelex-100 preconcentration system is described. Samples of drinking water in the Ottawa valley region were taken using this device and analysed for cadmium, copper, lead and zinc by atomic absorption spectrophotometry. Satisfactory comparisons were made with results obtained using a batch-integrated sampler.

--

Health and Welfare Canada

1983

**************************************************************************************

ORGANIC COLOR REMOVAL

DAVIS, E.

UNIVERSITY OF SASK.

University of Saskatchewan
Dept. of Civil Engineering
Saskatoon Saskatchewan
S7N 0W0

SURVEY

To determine chemical processes required to destabilize strong organically coloured water. Objective to reduce the colour in waters originating in the coniferous forest areas and thus reduce THM precursers.

$7,000.

U. of Sask.

1985 - open

****************************************************************************

## ORGANOCHLORINE PESTICIDE LEVELS IN OTTAWA DRINKING WATER, 1976

WILLIAMS, D.T. ; BENOIT, F.M. ; MCNEIL, E.E. ; OTSON, R.

HEALTH AND WEL. CAN.

Health and Welfare Canada
Bur. of Chemical Hazards
Ottawa Ontario

WATDOC

Duplicate samples of Ottawa drinking water were collected once a month during 1976 and analyzed for organochlorine pesticides. The samples were analyzed by gas chromatography, mass spectrometry, and pesticides were identified by comparing their retention times, coupled with selected ion monitoring with those of known standards.

N/A

Health and Welfare Can.

1978

PENDER HARBOUR SANITARY SURVEY - 1977

GOUGH, G.R.

MINISTRY OF ENV., B.C.

Ministry of Env, B.C.
Pollution Control Branch
Victoria B.C.

WATDOC

A sanitary survey condusted by the Pollution Control and Health Branches in Aug. and Sept., 1977, revealed that of approx. 336 waterfront homes surveyed, 31 or 9% discharged sewage directly into the sea. An additional group of 15 homes or 4% of the total had problems with their systems which placed them in a pollution risk category. These sources no doubt contributed to the bacteriological contamination formerly attributed mostly to boaters and some of the ranches bordering E. Pender Harbour.

N/A

Province of B.C.

1978

**************************************************************************

PERSISTANCE OF HUMAN ENTERIC BACTERIA IN THE CANADIAN NORTH

SPENCE, M.R. ; WHITE, L.A.

N/A

AL

The results are reported of a study to assess the bacteriological hazard of open field latrines in the Canadian north. Faeces and soil were sampled at 5 latrine sites, snow samples were collected at spring thaw. Human enteric bacteria persisted for a least 9 months inopen latrine sites and persisted for at least 9 months in open latrine sites and penetrated the sub-surface. Lateral migration of bacteria was minimal except at spring thaw.

N.A

N/A

1976

*********************************************************************************

PESTICIDES/HERBICIDES AND ADJUVANTS IN DRINKING WATER

WEINBERGER, PEARL

UNIVERSITY OF OTTAWA

University of Ottawa
Biology Department
Ottawa Ontario
K1N 6N5

SURVEY

Determination of formulation adjunct and pesticide herbicide concentrations in drinking water. Objectives: to determine whether contamination of wells in agricultural lands is common, to quantify levels (if any found) and assess toxicity.

-

support contract currently being written

****************************************************************************

# PILOT PLANT STUDIES TO EFFECT CHRYSOTILE ASBESTOS FIBRE REDUCTION DURING POTABLE WATER TREATMENT

ROBERTS, K.J. ; LAWRENCE, J. ; HUNSINGER, R.B.

ONT. MINISTRY OF ENV.

Ontario Min. of Environment

Toronto Ontario

AL

The effectiveness of coagulation and sedimentation followed by dual-media filtration in removing chrysotile asbestos fibres from a surface water influent was investigated in a specially adapted pilot plant. River water was dosed with controlled amounts of fibre suspensions prior to passage through the remainder of the plant, since the natural fibre concentration was too low for reliable measurements of the degree of removal.

?

Ont. Ministry of Environment

1978

**********************************************************************************************

PILOT STUDIES IN THE USE OF OZONE FOR DOMESTIC WATER TREATMENT

BADAKHSHAN, A.

UNIVERSITY OF CALGARY

University of Calgary
Dept. of Engineering
Calgary Alberta
T2N 1N4

SURVEY

$30,000.

Alberta Environment

FISCAL 1983-85

**************************************************************************************

PLATE COUNT METHODOLOGY FOR CHLORINATED DRINKING WATER SAMPLES

ROBERTSON, WILLIAM

N.S. RESEARCH

N.S. Research
Box 790, 100 Fenwick Street
Dartmouth N.S.
B2Y 3Z7

SURVEY

Media (4), incubation (4) and brands of membrane filters (4) were examined to determine how they influence the total plate count of chlorinated drinking water. Basic objective was to determine the best total plate count methodology for chlorinated drinking water.

$6,500.

Health and Welfare Canada

September/1982 - December/1982

**************************************************************************

POLIOVIRUSES AS INDICATOR OF VIROLOGICAL QUALITY OF WATER

PAYMENT, P. ; LAROSE, Y. ; TRUDEL, M.

INST. ARMAND FRAPPIER

Institut Armand Frappier
Centre Recherche en Virologie
Ville Laval Quebec

WATDOC

Viruses were found in 47 out of 53 samples of raw domestic sewage collected over a 13-month period from a high socioeconomic level community. At least 39 out of these 47 samples contained polioviruses as was expected in a population where children were receiving sabin live attenuated vaccine. Polioviruses could then be used as a suitable indicator of the virological quality of water in communities where sabin vaccine is used.

N/A

N/A

1979

**************************************************************************

## POLYCYCLIC AROMATIC HYDROCARBON LEVELS IN EASTERN ONTARIO DRINKING WATERS, 1978

WILLIAMS, D.T. ; BENOIT, F.M. ; LEBEL, G.L.

HEALTH AND WELFARE

Health and Welfare Canada

Ottawa Ontario

AL

Drinking waters of five municipalities in Eastern Ontario were monitored for 12 selected low molecular weight polycylic aromatic hydrocarbons (PAH) and 4 oxygenated PAH derivatives using Amberlite XAD-2 macroreticular resin for analysis at the ng per litre level. The results are compared with a previous survey. Oxygenated PAH levels showed an increase. Study of the water basins indicates that contamination of potable water is related to population density of the area.

N/A

N/A

1979

********************************************************************************

POTABLE WATER PROTECTION IN DOMESTIC HOT WATER HEATING SYSTEMS

AITKEN, W.D. ; SHEAFF, N.B.

D.F.A. ENGINEERING LTD.

D.F.A. Engineering Ltd.

CISTI

N/A

N.R.C.

1979

*************************************************************************

## PRECHLORINATION AND TRIHALOMETHANE FORMATION AT WATER TREATMENT PLANTS

VAJDIC, A.H.

ONT. MINISTRY OF ENV.

Ont. Ministry of Environment
Pollution Control Plant
Toronto Ontario
M4V 1P5

WATDOC

The levels of THM's produced at three Metro Toronto water plants were studied, both with and without prechlorination. With prechlorination, average total THM ranged from 10.1 to 14.9 micro g/L, well within the maximum acceptable concentration of 350 micro g/L, defined in the Guidelines for Canadian Drinking Water Quality. Without prechlorination, THM production appeared to be lower on average.

N/A

Ont. Ministry of Environment

1980

****************************************************************************************

## PREDICTION OF BIOLOGICAL AVAILABILITY OF ORGANIC CHEMICAL POLLUTANTS TO AQUATIC ANIMALS AND PLANTS

BLOUW, A.P. ; MUIR, D.C.G. ; LOCKHART, W.L. ; METNER, D.A.

DEPT. OF FISH. AND OCEANS

Dept. of Fisheries and Oceans

Winnipeg Manitoba

AL

Rainbow trout fry, chironomid larvae and duckweed plants were exposed to a series of c14 labelled compounds in different types of water to determine whether the type of water influenced the accumulation of chemicals by the respective organisms. Fish, insects and aquatic plants consistently accumulated compounds less efficiently from river water than from dechlorinated tap water.

N/A

N/A

1982

*********************************************************************************

PRELIMINARY ENVIRONMENTAL STUDIES IN THE IRONDALE AREA

GARTNER, J.F.

GARTNER LEE ASSOC. LTD.

Gartner Lee Assoc. Ltd.
Toronto Buttonville Airport
Markham Ontario
L3P 3J9

SURVEY

Chlorinated hydrocarbons such as Aroclor 1242 were found in unusually high concentrations in both water and sediments in Lake-of-the Woods. These were of unnatural origin and may be correlated with road oiling (PCB contamination). Basic objectives were to document background terrain and water resource characteristics of lands, water and sediment in the Irondale area of Haliburton County.

N/A

St. Joseph Explorations Ltd.

1978 - Jan 31, 1979

********************************************************************************

# PRELIMINARY STUDIES ON THE LEACHING OF SOME TRACE METALS FROM KITCHEN FAUCETS

SAMUELS, E.R. ; MARANGER, J.C.

HEALTH AND WELFARE

Health and Welfare Canada

Ottawa Ontario

AL

Tabulated results are presented from preliminary studies on the leaching of trace metals from kitchen taps by samples of raw and treated water supply in Ottawa, well water and an aqueous solution of fulvic acid. The amounts of metals leached varied depending of the type of tap and the leaching solution used. The concentrations of copper, zinc, chromium and cadmium in the leachates were below the maximal permissable limits for drinking water, but there was a risk of high concentrations of lead..

--

Health and Welfare Canada

1984

****************************************************************************

PRELIMINARY STUDY ON THE EFFECT OF AN ASBESTOS CONTAINING ORE USED AS A RAILROAD BALLAST ON THE QUALITY OF DRINK. WATER

MERANGER, J.C. ; DAVEY, A.B.C.

HEALTH AND WELFARE

Health and Welfare Canada
Env. Health Directorate
Ottawa Ontario

ELIAS

N.A.

Health and Welfare Canada

1980

***********************************************************************************

PROPOSED: COMPARATIVE STUDY OF WATER QUALITY IN THE ELBOW AND BOW RIVER WATERSHEDS NEAR CALGARY, ALBERTA

TRUMP, G.S. ; HARGESHEIMER, E.E.

MOUNT ROYAL COLLEGE

Mount Royal College
4825 Richard Road S.W.
Calgary Alberta
T3E 6K6

SURVEY

Proposal to undertake an extensive water quality study of the Bow and Elbow River reservoirs. To investigate and compare variations in microbiological chemical and physical water quality parameters from spring run-off, reservoir distratification and through early winter at several locations. (APPLICATION SUBMITTED FEBRUARY 13, 1985)

$84,500.

Alberta Environment

May 1/1985 - May 1/1986

********************************************************************************

QUALITE DE L'EAU D'ALIMENTATION A MONTREAL, LONGUEUIL ET LEVIS

MCGIRR, D.J.

ENVIRONNEMENT CANADA

Environnement Canada

Ottawa Ontario

ELIAS

N/A

Environnement Canada

1977

********************************************************************************

QUALITES PHYSICO-CHIMIQUES DE L'EAU DE ROUYN NORANDA

AZZARIA, L.M. ; POTVIN, C.

UNIVERSITE LAVAL

Universite Laval
Centre Recherches sur l'Eau
Quebec

CISTI

Universite Laval

1979

****************************************************************************

RADIOACTIVITY OF DRINKING WATER

DAVIES, KEITH

DEPT. OF HEALTH, N.B.

Department of Health

Fredericton N.B.

SURVEY

Evaluation of degree of radioactivity of drinking water in Edmunston water supply.

N/A

Dept. of Health, N.B.

completed

********************************************************************************

## RADIONUCLIDE LEVELS IN WELL WATER FROM THE LAC DU BONNET AREA OF MANITOBA

BROWN, DENNIS J.

MAN. DEPT. OF ENVIRONMENT

Man. Dept. of Environment
Bldg. 2, 139 Tuxedo Ave.
Winnipeg Manitoba
R3N 0H6

SURVEY

Well water concentrations of uranium, radium 226 and/or gross alpha and gross beta activities are measured on request. As a service to the public, levels of these substances are measured in all public wells near the Lac du Bonnet batholith and in the private wells of concerned members of the public.

$ 50,000.

Province of Manitoba

August 1982 - continuing

***********************************************************************

RADON AND RADON DAUGHTERS IN HOMES UTILIZING DEEP WELL WATER SUPPLIES, HALIFAX COUNTY, N.S.

MCGREGOR, R.G. ; GOURGON, L.A.

HEALTH AND WELFARE CANA

Health and Welfare Canada
Radiation Protection Bureau
Ottawa Ontario
K1A 1C1

WATDOC

The concentration of radon in tap water supplies varied from 47 nCi/l to 370 nCi/l. Indoor air concentrations varied from greater than 0.5 pCi/l to 19.1 pCi/l and 0.001 WL to 0.025 WL for radon and radon daughters, respectively. The transfer of radon from tap water raised the radon concentration in the bathroom air during operation of the shower. Transfer efficiencies of 37% to 70% were observed.

N.A.

Health and Welfare Canada

1980

******************************************************************************

RECHERCHE DE VIRUS DANS LES EAUX DE DISTRIBUTION GRACE A UNE NOUVELLE TECHNIQUE

DRAPEAU, A.J.

ECOLE POLYTECHNIQUE

Ecole Polytechnique

Montreal Quebec

SURVEY

$9946.

N.H.R.D.P.

1974-76

*********************************************************************************

## RECHERCHE DE VIRUS ENTERIQUES HUMAINS DANS LES EAUX D'EGOUT

PAYMENT, D. PIERRE

INSTITUT ARMAND-FRAPPIER

Centre de Virologie
Institut Armand-Frappier
Montreal Quebec

SURVEY

******************************************************************************************

RECHERCHE DE VIRUS ENTERIQUES NON POLIOMYELITIQUES DANS LES EAUX D'EGOUTS

PAYMENT, PIERRE

INSTITUT ARMAND FRAPPIER

Institut Armand Frappier
531 boul. des Prairies
Laval des Rapides Quebec
H7N 3X7

NHRDP

$23,182.

N.H.R.D.P.

1981-82

******************************************************************************

RECREATIONAL AND DRINKING WATER MONITORING PROJECT

FORTIN, B.M.

PORCUPINE HEALTH UNIT

Community Health
169 Pine St. S. p.b. 2012
Timmins Ontario
P4N 8B7

SURVEY

Assessment of the physical, bacteriological - chemical and biological condition of area lakes, to assess the impact of cottage development and recreational use.

$10,000.

Canada Works

May 1/84 - Aug 31/84

***********************************************************************************

## RECREATIONAL WATER QUALITY IN THE SOUTH PEACE HEALTH UNIT DISTRICT

QUINN, MURRAY

GRANDE PRAIRIE HLTH UNIT

Grande Prairie Health Unit
10320 - 99 Street
Grande Prairie Alberta
T8V 6J4

SURVEY

Bacteriological testing conducted on recreational waters in the South Peace Health Unit.

August 1984

***************************************************************************************

REDUCTION OF HALOFORMS IN DRINKING WATER SUPPLIES

FUNG, M.C.

MIN. OF ENVIRONMENT

Ont. Ministry of Environment
Pollution Control Branch
Toronto Ontario

ELIAS

N/A

Ministry of Environment

1978

**************************************************************************************

REGINA/MOOSE JAW DRINKING WATER QUALITY

PROV. OF SASKATCHEWAN

Province of Saskatchewan
Water Pollution Control Branch
Regina Saskatchewan

MICROLOG

N/A

Province of Saskatchewan

1984

********************************************************************************

## RELATION BETWEEN TRACE ELEMENTS IN DRINKING WATER AND THE DIET AND DENTAL CARIES - A PILOT STUDY

LILIENTHAL, DR. B.

DALHOUSIE UNIVERSITY

Dalhousie University
Faculty of Dentistry
Halifax N.S.

SURVEY

N / A

N/A

N/A

# RELATIONS AMONG POLLUTION INDICATOR BACTERIA ISOLATED FROM RAW WATER & DISTRIBUTION SYSTEMS BY THE PRESENCE/ABSENCE TEST

CLARK, J.A. ; VLASSOFF, L.T.

ONT. MINISTRY OF ENV.

Ont. Ministry of Environment
Bacteriology Section
Rexdale Ontario

WATDOC

Comparative analyses of raw and drinking water samples were made using membrane filter (MF) and presence absence (P-A) procedures. Analysis of raw water samples was more suited to MF procedures, whereas analysis of drinking water wamples was more effectively performed by the P-A procedure.

N/A

Ontario M.O.E.

1973

******************************************************************************

RELATIONSHIP BETWEEN WATER QUALITY AND DEATHS FROM CVD IN CANADA

NERI, L.C. ; PEARSON, R.J.C.

UNIVERSITY OF OTTAWA

University of Ottawa

Ottawa Ontario

NHRDP

$108,458.

N.H.R.D.P.

1974-78

***************************************************************************************

## RELATIONSHIPS BETWEEN RAW WATER QUALITY, TREATMENT, AND OCCURRENCE OF ORGANICS IN CANADIAN POTABLE WATER

OTSON, R. ; WILLIAMS, D.T. ; BIGGS, D.C.

HEALTH & WELFARE

Health and Welfare Canada

Ottawa, Ontario

AL

?

Health and Welfare Canada

1982

**********************************************************************************

# REMOVAL OF ARSENIC FROM CONTAMINATED DRINKING WATER BY A CHITOSAN/CHITIN MIXTURE

ELSON, C.M. ; DAVIES, D.H. ; HAYES, E.R.

ST. MARY'S UNIVERSITY

St. Mary's University
Dept. of Chemistry
Halifax N.S.
B3H 3C3

WATDOC

A chitosan/chitin mixture was studied as a potential agent for the removal of arsenic (V) from ground waters. The arsenic concentration of contaminated waters was lowered to levels accepted by the Dept. of Health and Welfare and the W.H.O. upon treatment with the mixture and, furthermore, the copper and sulfate levels were also reduced.

N/A

N/A

1980

***************************************************************************************

# REMOVAL OF ORGANICS IN WATER USING HYDROGEN PEROXIDE IN PRESENCE OF ULTRAVIOLET LIGHT

MALAIYANDI, M. ; SADAR, M.H. ; LEE, P. ; O'GRADY, R.

HEALTH AND WELFARE CAN

Health and Welfare Canada
Bur. of Chemical Hazards
Ottawa Ontario
K1A 0L2

WATDOC

The optimum conditions for the removal of dissolved organic impurities from water using hydrogen peroxide (50%) followed by ultraviolet irradiation were investigated.

N/A

Health and Welfare Canada

1980

*****************************************************************************

## REMOVAL OF TRACE TOXIC ORGANICS IN A CONTAMINATED GROUNDWATER

DROSTE, R.L.

UNIVERSITY OF OTTAWA

University of Ottawa
Dept. of Civil Engineering
Ottawa Ontario
K1N 9B4

SURVEY

Tower air stripping will be used to determine removal of various volatile compounds at different air-water flow rates. Objectives: to determine overall energy costs per unit removal; to examine various media generations for effect on removal and energy consumption.

$50,000.

NSERC

September/1984 - June/1985

****************************************************************************************

RESERVOIR WATER QUALITY DETERIORATION

DAVIS, E.

UNIVERSITY OF SASK.

University of Saskatchewan
Dept. of Civil Engineering
Saskatoon Saskatchewan
S7N 0W0

SURVEY

Quality of water stored in prairie reservoirs monitored for deterioration, organic and inorganic. To determine the underlying factors of the very rapid deteriorating of stored water.

$25,000.

U. of Sask.

Jan/1983 - open

****************************************************************************************

# RESULTS OF THE TWO NATIONAL STUDIES OF THE Ca, Co, Cd, Cr, Cu, Mg, Ni, Pb, AND Zn CONTENTS OF DRINKING WATER IN CANADA

SUBRAMANIAN, K.S. ; CHALIFOUX, C. ; MERANGER, J.C.

HEALTH AND WELFARE

Health and Welfare Canada

Ottawa, Ontario

AL

Two studies carried out on trace element concentrations in raw, treated and tap water in Canada show that they do not reach hazardous the method was not efficient in the recovery of echovirus.

N/A

Health and Welfare Canada

1979

******************************************************************************

REVIEW OF MATERIALS IN CONTACT WITH POTABLE WATER AND TESTS FOR EVALUATION FOR UNSUSPECTED HEALTH HAZARDS

SMITH, D.K. ; BROWN, W.D.

HEALTH & WELFARE CANADA

Health and Welfare Canada
Env. Health Directorate
Ottawa Ontario

ELIAS

N/A

Health and Welfare Canada

1983

***********************************************************************

ROCKY CREST RESORT, LAKE JOSEPH, TWP OF HUMPHRIES HAMER BAY PARRY SOUNT DISTRICT

BROWN, BRUCE A.

BRUCE A. BROWN ASSOCIATES

Bruce A. Brown Associates
148 Willowdale Avenue
Willowdale Ontario
M2N 4Y4

SURVEY

A component of comprehensive two year monitoring program relating to potable water supply, water quality on beach and water courses and sewage treatment. The basic objectives were to ensure water quality and investigate adequacy of treatment of iodide disinfection system for 125 unit new resort opening May 1985.

$40,000.

Private

May 1985 - October 1987

*******************************************************************************

S AREA LANDFILL, NIAGARA FALLS, NEW YORK

ANDERSON, GRANT

GARTNER LEE ASSOC. LTD.

Gartner Lee Assoc. Ltd.
Toronto-Buttonville Airport
Markham Ontario
L3P 3J9

SURVEY

Hydrochemical impact assessment of organic chemical migration from a chemical dump site. Identify potential environmental impacts and assess the adequacy of proposed survey studies and remedial technology.

N.A.

Environment Canada

1982 -1983

*****************************************************************************

# SOLUBLE AND SEDIMENT NITROGEN LOSSES AS RELATED TO LAND USE AND TYPE OF SOIL IN EASTERN CANADA

MACKENZIE, A.F. ; NEILSEN, G.H.

n/ a

AL

Measurements of discharge rates, soluble inorganic nitrogen and sediment Kjeldahl nitrogen were performed on the run-off from seven agricultural catchment areas in southwest Quebec, and southeast Ontario in order to relate the extent of nitrogen losses to soil type and land use. The data indicated that mean soluble nitrogen concentrations were below drinking water standards for all sites but above potential eutrophication levels for most.

n/a

n/a

1977

************************************************************************************

## ST. CLAIR RIVER ORGANICS STUDY, IDENTIFICATION AND QUANTITATION OF ORGANIC COMPOUNDS

BONNER, R.F. ; MERESZ, O.

MINISTRY OF ENVIRONMENT

Ont. Ministry of Environment
Lab. Services Branch
Toronto Ontario

WATDOC

This report presents and discusses data on the organic compounds present in a variety of samples collected from the vicinity of the St. Clair River in 1977 and 1978. It forms part of a major study on this river system which was initiated following exploratory work in 1975/76.

N/A

Ministry of Environment

1981

****************************************************************************

ST. PAUL TASTE AND ODOUR REMOVAL PROGRAM

MATATKO, MATT; SCOTTEN, ROBERT

NORTH EASTERN ALTA. HEALT

North Eastern Alta. Health
Box 1468
St. Paul Alberta
T0A 3A0

SURVEY

Development of a treatment process capable of handling fluctuating taste and odour problems. To determine the cheapest and most effective method of removing taste and odour from a surface water supply.

FUNDING AS NEED

SOURCE: TOWN OF ST. PAUL, ALTA.

DEC/84-DEC/85

*****************************************************************************

STUDIES ON DETOXIFICATION OF PULP MILL EFFLUENTS

KUTNEY, DR. J.P.

UNIVERSITY OF B.C

University of B.C.
Chemistry Department
Victoria B.C.
V6T 1W5

SURVEY

The biological degration of fish toxic substances as an approach to improvement of water quality.

$87,500.00

NSERC STRATEGIC OPERATING GRANT

*************************************************************************

STUDIES ON MICROPOLLUTANTS

VACHON, JEAN

ENVIRONNEMENT QUEBEC

Environnement Quebec
3900 Rue Marley, 4e etage
Sainte-Foy Quebec
G1X 4E4

SURVEY

Analysis on samples of raw and treated drinking water in 15 cities; to detect the presence of about 100 organic contaminants.

$50,000.

Environnement Quebec

March/85-undetermined finish date

******************************************************************************

STUDY OF POTABLE WATER QUANITITY AND QUALITY DEFICIENCIES IN CANADIAN COMMUNITIES

ROCHE ASSOCIES LTEE.

Roche Associes Ltee.

MICROLOG

N.A.

Central Mortgage and Housing

1979

**************************************************************************

## STUDY OF THE TREATABILITY OF GROUND WATER CONTAMINATED BY TOXIC ORGANIC CHEMICALS IN THE VICINITY OF MERCIER TOWNSHIP

NGUYEN, P. ; SIMARD, G.

S.N.C. INC.

S.N.C. Inc.
1, Complexe Desjardins
Montreal Que.
H5B 1C8

AL

Improper containment of waste organic liquids at a site near Mercier, Que. resulted in contamination of the groundwater with a variety of organic chemicals, including phenols, aliphatic and aromatic organochlorines and solvents at concentrations in excess of those permitted for discharges to surface water and for drinking water supplies. A special abstraction and treatment plan was constructed. Details of the preliminary tests prior to setting up the final plant are given.

--

--

1982

****************************************************************************************

# SUBCHRONIC STUDY OF A MIXTURE OF INORGANIC SUBSTANCES PRESENT IN THE GREAT LAKES ECOSYSTEM IN MALE AND FEMALE RATS

CHU, I. ; VILLENEUVE, D.C. ; BECKING, G.C. ; LOUGH, R.

HEALTH & WELFARE

Health and Welfare Canada
Bur. of Chemical Hazards
Ottawa Ontario
K1A 0L2

WATDOC

Low levels of some heavy metals and inorganic substances have been detected in the Great Lakes ecosystem including arsenic, cadmium, chromium, copper, iron, mercury, nickel, selenium, zinc and fluoride. This study was designed to investigate the toxic effects of a combination of inorganic substances in the rat when administered at levels equal or greater than the objectives established in the Great Lakes Water Quality Agreement (1978).

N/A

Health and Welfare Canada

1981

****************************************************************************

# SUITABILITY OF THE MODIFIED FLUCTUATION ASSAY FOR EVALUATING THE MUTAGENICITY OF UNCONCENTRATED DRINKING WATER

HARRINGTON, T.R. ; KOWBEL, D.J. ; NESTMANN, E.R.

HEALTH AND WELFARE

Health and Welfare

Ottawa Ontario

AL

The mutagenicity of filter-sterilized unconcentrated tap water was determined in Salmonella strain TA 100 using an adaptation of the modified flucutuation assay of Gren et al (1976). A significant mutagenic response was obtained, usually with dose related increases in positive tubes, but, as the average number of cells increased proportionally with the no. of positive tubes scored for each dose, the elevation in mutation was probably spontaneous rather than due to induction by chemical mutagens.

?

?

1983

******************************************************************************

SURFACE WATER CONTAMINATION FROM SANITARY LANDFILLS

BAKER, B.L.

UNIVERSITY OF CALGARY

University of Calgary

Calgary Alberta
T2N 1N4

SURVEY

$25,000.

ALBERTA ENVIRONMENT

FISCAL 1983-85

**************************************************************************

SURVEY CHLORINATED PHENOLS IN FRASER RIVER ESTUARY

HALL, K.J.

UNIVERSITY OF B.C.

Wastwater Research Centre
University of B.C.
Vancouver B.C.
V6T 1W5

SURVEY

$4,899.00

DOE: INLAND WATER DIRECTORATE

****************************************************************************************

SURVEY OF NIAGARA AREA & SELECTED LAKE ONTARIO MUNICIPAL DRINKING WATER SUPPLIES

Ont. Min. of Environment

Ont. Ministry of Environment

Toronto Ontario

MICROLOG

N/A

Ont. M.O.E.

1984

*******************************************************************************

SURVEY OF NIAGARA AREA AND SELECTED LAKE ONTARIO MUNICIPAL DRINKING WATER SUPPLIES

ONT. MIN. OF ENVIRONMENT

Ont. Ministry of Environment

Toronto Ontario

MICROLOG

N/A

Ont. M.O.E.

1984

********************************************************************************

## TALC CELITE LAYERS IN VIRUS RECOVERY FROM POTABLE WATERS EXPERIMENTALLY CONTAMINATED WITH FIELD ISOLATES AND SEWAGE

RAMIA, S. ; SATTAR, S.A.

UNIVERSITY OF OTTAWA

University of Ottawa

Ottawa Ontario

AL

The authors have tested the efficiency of the talc Celite technique in recovery of field isolates of enteric viruses added to potable waters and of indigenous viruses from samples of potable waters contaminated in the laboratory with crude sewage. The behaviour of the field strains on talc-Celite layers was similar to that of the laboratory-adapted strains with recovery in the range 82-93 per cent. Both simulated and actual field conditions have shown that the technique is satisfactory.

N/A

N/A

1979

**********************************************************************************

TAPWATER CONSUMPTION IN CANADA

ARMSTRONG, V.C. ; HOLLIDAY, M.G. ; SCHRECKER, T.F.

HEALTH AND WELFARE

Health and Welfare Canada
Environmental Hlth Directorate
Ottawa Ontario

ELIAS

N / A

Health and Welfare Canada

1981

**********************************************************************************

## TEMISKAMING DISTRICT SURFACE WATER MONITORING FOR CATIONS AND ANIONS

CHILIBECK, MR. JAMES

NORTHERN COLLEGE

Northern College
P.O. Bag "A"
Haileybury Ontario
P0J 1K0

SURVEY

Water sampling and analysis on an 'ongoing' basis. Basic objective is to compile background and unusual concentration increases of cations and anions in local waters.

N/A

Northern College

1969 - ongoing

********************************************************************************

## THE BOW RIVER WATER QUALITY IN TERMS OF ORGANIC COMPOUNDS

TELANG, S.A.

UNIVERSITY OF CALGARY

Kananaskis Centre for Env.Res.
BIO.SCI 042, University of Cal
Calgary Alta.

SURVEY

Various organic compounds are investigated for this presence, transport and fate in the Bow River waters. The downstream users of the Bow River have complained for many years about the deteriorating quality of the Bow River as it reaches their communities and have blamed the City of Calgary. The project was therefore undertaken. It does not involve direct health aspect research.

Approx. $26,000

Alberta Environmental Research Trust

April/1983 - May/1986

******************************************************************************

THE DANGER FROM ASBESTOS FIBRES IN POTABLE WATER

DRAPEAU, A.J.

N /A

AL

The author reports the results of a survey of tap water in the Canadian provinces of Ontario and Quebec, which showed that tap water in the town of Thetford, Que. contained 172.7 million asbestos fibres per Litre. The characteristics of asbestos fibres an their possible danger to public health are briefly discussed, and the events at Duluth, Minn., instigated by the U.S. E.P.A. during a week following the discovery of 87 million asbestos fibres per litre inthe tap water are reported.

N/A

N/A

1975

******************************************************************************

## THE DETERMINATION OF POLYCYCLIC AROMATIC HYDROCARBONS AT THENG/L LEVEL IN OTTAWA TAP WATER

WILLIAMS, D.T. ; BENOIT, F.M. ; LEBEL, G.L.

HEALTH AND WELFARE CAN.

Health and Welfare Canada

Ottawa Ontario

AL

Analysis by gas chromatography/mass spectrometry, following extraction using a macroreticular resin, of Ottawa drinking water revealed in January and February samples, 30-36 polycyclic aromatic hydrocarbons (PAH) and 4-5 oxygenated PAH. Concentrations ranged from 0.05-14 ng per litre. Twenty-eight PAH and four 0-PAH were common to the two samples. The use of Amberlite XAD-2 resin to extract PAH from drinking water is shown to be effective.

n/a

Health and Welfare Canada

1979

********************************************************************************

THE EFFECT OF WATER SUPPLY MANAGEMENT POLICIES ON FUTURE RISK OF SHORTAGES

GYSI, M.

UNIVERSITY OF CALGARY

University of Calgary
Dept. of Engineering
Calgary Alberta
T2N 1N4

SURVEY

$11,631.

NSERC - NAT. SCIENCES & ENG. RES. COUNC.

FISCAL 1983-85

* * *

## THE EFFECTS OF NITROGEN OXIDES ON NATIVE VEGETATION, SOILS, AND WATER NEAR A COMPRESSOR INSTALLATION

LEGGE, A.H.

UNIVERSITY OF CALGARY

University of Calgary

Calgary Alberta
T2N1N4

SURVEY

The effects of nitrogen oxides on native vegetation, soils and water near a compresor installation - Mobil Carson Creek Cycling Plant.

$125,000.

ALBERTA ENVIRONMENT

FISCAL 1983-85

****************************************************************************

# THE OZONATION OF NATURAL WATERS: PRODUCT IDENTIFICATION

LAWRENCE, J. ; COMBA, M.E. ; ONUSKA, F.I. ; TOSINE, H.

CAN. CEN. FOR INLAND WAT

Canada Centre for Inland Water

Burlington Ontario

AL

Gas chromatography-mass spectrometry has been used to identify the oxidation products of aqueous solutions of fulvic acid, ozonated under simulated water-treatment plant conditions. Both synthetic solutions of a well characterized fulvic acid and natural high humic water from a creek in Ontario, were examined. The predominant oxidation products include alkyl phthalates, mono- and di-carboxylic aliphatic acids and some cyclic keto compounds.

N/A

N/A

1980

********************************************************************************

THE REMOVAL OF ORGANICS FROM DRINKING WATER BY OZONATION, BIODEGRADATION AND ACTIVATED CARBON ADSORPTION

BENEDEK, A.

FENCO CONSULTANTS LTD.

Fenco Consultants Limited

ELIAS

n.a.

Health and Welfare Canada

1979

******************************************************************************************

TORONTO'S DRINKING WATER : A CHEMICAL ASSESSMENT

CAMPBELL, J. ; BLEIWAS, A. ; DAVIES, K.

DEPT. OF PUB. HEALTH, TOR

Dept. of Public Health

Toronto Ontario

MICROLOG

N.A.

Dept. of Public Health, Toronto

1984

**************************************************************************

TOWNSHIP OF TINY - ERIC PAUZE CONSTRUCTION LTD. WASTE DISPOSAL SITE - HYDROGEOLOGIC STUDY

LEE, P.K.

GARTNER LEE ASSOC LTD.

Gartner Lee Assoc. Ltd.
Toronto-Buttonville Airport
Markham Ontario
L3P 3J9

SURVEY

This report documents the hydrogeological situation of the site, outlines the present leachate plume and predicts some future effects of plume migration. It also identifies possible remedial actions and recommends an alternate water supply method and monitoring program. Basic objectives are to monitor the migration of a leachate plume from a waste disposal facility and to determine if it is the source of high levels of trichloroethylene in nearby water supply systems.

N/A

Central Region, MOE

Feb. 1983 - Nov. 1983

****************************************************************************************

TOXIC COMPOUNDS IN POTABLE WATER AND SEWAGE PLANT EFFLUENTS

RAPSON, W.H.

UNIVERSITY OF TORONTO

University of Toronto
Dept. of Chemical Engineering
Toronto Ontario

IEC

$83,952.

NSERC

1978-79

**************************************************************************************************************

# TOXIC EFFECTS OF LEAD AND LEAD COMPOUNDS ON HUMAN HEALTH, AQUATIC LIFE, WILDLIFE, PLANTS AND LIVESTOCK

DEMAYO, A. ; TAYLOR, M.C. ; TAYLOR, K.W. ; HODSON, P.V.

DEPT. OF ENVIRONMENT

Dept. of Environment
Inland Waters Directorate
Ottawa Ontario

WATDOC

Lead uptake by plants is limited by the low availability of lead from soils, and are not as affected by lead as they are by zinc and coppe. It seems that the edible parts of plants do not have the tendency to concentrate lead with the exception of lettuce and some other leafy vegetables. In some cases the parts of the vegetables not used for human consumption are used for livestock feeding and because of this, the lead levels in these parts are also important.

N/A

Environment Canada

1982

******************************************************************************

## TRIHALOMETHANE LEVELS IN CANADIAN DRINKING WATER

WILLIAMS, D.T. ; OTSON, R. ; BOTHWELL, P.D. ; MURPHY, K.L.; ROBERTSON, J.L.

HEALTH & WELFARE CANADA

Health and Welfare Canada
Env. Health Directorate
Ottawa Ontario
K1A 0L2

WATDOC

To determine the extent of the occurrence of trihalomethane in drinking water across Canada, a national survey of Canadian drinking water has been carried out. The survey covered 70 municipalities with the number of municipalities sampled per province being roughly proportional to population. This summarizes the data from this survey on THM levels.

N/A/

Health and Welfare

1980

************************************************************************

TRIHALOMETHANE REDUCTION DUE TO WATER TREATMENT PLANT OPTIMIZATION

DAVIS, E.

UNIVERSITY OF SASK.

University of Saskatchewan
Dept. of Civil Engineering
Saskatoon Saskatchewan
S7N 0W0

SURVEY

Pilot plant study to determine chemicals, sequence of chemicals and plant operation to reduce the production of THM. Objective, to determine the water treatment plant configuration to minimize THM production.

$16,000.

NSERC

April/1985 - March/1986

****************************************************************************

TWIN BUTTE SOIL AND WATER EVALUATION

STROSHER, M.; KROUSE, H.R.

UNIVERSITY OF CALGARY

University of Calgary

Calgary Alberta
T2N 1N4

SURVEY

$ 16,000.

ENVIRONMENT CANADA

FISCAL 1983-85

*****************************************************************************

## USE AND EFFECTS OF CHEMICAL COAGULANTS IN WATER AND WASTEWATER TREATMENT

HRUDEY, S.E.; SMITH, D.

UNIVERSITY OF ALBERTA

University of Alberta
Civil Engineering Department
Edmonton Alberta
T6G 2J9

SURVEY

This study determines the effect of chemical coagulation on microorganism removal in a sewage lagoon prior to spring discharge. One of the principal objectives of wastewater treatment is to reduce the number of indicator organisms released into the environment, as pathogenic organisms are related to the quantities of indicator bacteria. To determine the effect of chemical coagulation on microorganism removal in a sewage lagoon prior to spring discharge.

$7,650.

Alberta Environment

June 1/1983 - March 11, 1984

********************************************************************************

# USE OF AN ON SITE INTEGRATED PUMP SAMPLER FOR ESTIMATION OF TOTAL DAILY INTAKE OF SOME METALS FROM TAP WATER

LANGFORD, C.H. ; SUBRAMANIAN, K.S. ; UMBRASAS, R. ; MERANGER, J.C.

HEALTH AND WELFARE

Health and Welfare Canada

Ottawa Ontario

AL

An illustrated description is given of an on-site pump integrated sampler combined with a pressure sensitive switch, for collection and preconcentration of samples of drinking water from kitchen taps in direct proportion to water use. Results obtained using this equipment to determine the daily intake of metals (cadmium, copper, lead and zinc) from tap water in Mtl, over a 6-day period are tabulated and discussed.

Health and Welfare Canada

1984

**************************************************************************

## USE OF TALC CELITE LAYERS IN THE CONCENTRATION OF ENTEROVIRUSES FROM LARGE VOLUMES OF POTABLE WATERS

RAMIA, S. ; SATTAR, S.A.

UNIVERSITY OF OTTAWA

University of Ottawa

Ottawa Ontario

AL

Previous studies have shown that talc (hydrated magnesium silicate) can be used to recover viruses from water, and further studies have shown that incorporation of Celite 503 (diatoma- ceous earth) with the talc eliminates certain disadvantages in the use of talc alone. Details are given of experiments using a mixture of talc and Celite between sheets of filter paper with a Millipore prefilter disc on top, for the concentration of enteroviruses from experimentally contaminated drinking water.

N/A

N/A

1979

******************************************************************************

USES OF OZONE IN DRINKING WATER FOR TREATMENT

RICE, R.G. ; ROBSON, C.M. ; MILLER, G.W. ; HILL, A.G.

JACOBS ENGINEERING GROUP

Jacobs Engineering Group

AL

The results are reported of a two-year assessment of the status of ozonation for treating drinking water supplies. The assessment covered the applications of ozone in full-scale treatment plants which include oxidation of organic and inorganic materials, flocculation for removal of turbidity or suspended solids and recent developments in the promotion of aerobic biological processes conducted in filter and adsorption media.

?

?

1981

******************************************************************************

VARIATIONS IN THE URANIUM AND RADIOACTIVITY LEVELS OF POTABLE SURFACE & GROUND WATER IN THE OKANAGAN AND W. KOOTENAY REG

PROVINCE OF B.C.

B.C. Ministry of Health/E.M.&R

B.C.

MICROLOG

N/A

British Columbia

1980

******************************************************************************

VERTICAL MOBILITY OF PESTICIDE RESIDUES IN IRRIGATED MANITOBA SOILS

WEBSTER, G.R. BARRIE

UNIVERSITY OF MANITOBA

University of Manitoba
Pesticide Research Laboratory
Winnipeg Manitoba
R3T 2N2

SURVEY

A study of the extent to which various insecticides, herbicides, and fungicides move to groundwater in irrigated soils. Basic objectives to identify which pesticides are most suitable to be used in irrigated agriculture in Manitoba without contaminating groundwater; to develop a mathematical model to enable prediction of safety with respect to preservation of groundwater quality in areas of pesticide use.

$ 40,000.

Agriculture Canada, University of Man.

May/1982 - April/1985

****************************************************************************

# VIRAL POLLUTION OF SURFACE WATERS DUE TO CHLORINATED PRIMARY EFFLUENTS

SATTAR, S.A. ; WESTWOOD, J.C.N.

UNIVERSITY OF OTTAWA

University of Ottawa
School of Medicine
Ottawa Ontario

AL

The effects of primary treatment and chlorination on the concentration of viral organisms in primary sewage treatment were investigated by examining temporally co-ordinated samples at two works discharging chlorinated primary effluent to the Ottawa river. Chlorination produced a 10 to 50 fold reduction in the number of infective units and resulted in a level of 27 units per 100 ml in the final effluent, representing a release of 10 1 0 viral units per day into the aquatic environment.

n/a

n/a

1978

******************************************************************************

VIROLOGICAL EXAMINATION OF RAW AND FINISHED WATERS IN OTTAWA-HULL AND THE VICINITY.

SATTAR, S.A.

UNIVERSITY OF OTTAWA

University of Ottawa
School of Medicine
Ottawa Ontario

NHRDP

$80,000.

N.H.R.D.P.

1980-82

******************************************************************************

VIROLOGICAL SURVEY OF SELECTED DRINKING WATERS IN SOUTHERN ONTARIO

SUBRAHMANYAN, T.P.

ONT. MIN. OF HEALTH

Ontario Ministry of Health

Toronto Ontario

NHRDP

$80,000.

N.H.R.D.P.

1980-82

******************************************************************************

VIRUS MONITORING OF DRINKING WATER

PAYMENT, PIERRE

INSTITUT ARMAND FRAPPIER

C.P. 100
Laval des Rapides
Laval Quebec
H7N 4Z3

SURVEY

Virological analysis of several water filtration plants. Evaluates the level of viral pollution and the effects of low virus doses on human health.

--

H&W,CRSNG, MOE(QUE)

Project is ongoing

******************************************************************************

# VOLATILE ORGANIC COMPOUNDS IN WATER AT THIRTY CANADIAN POTABLE WATER TREATMENT FACILITIES

OTSON, R. ; BOTHWELL, P.D. ; WILLIAMS, D.T.

HEALTH AND WELFARE CAN.

Health and Welfare Canada

Ottawa, Ontario

AL

A survey of volatile organic compounds in raw and treated water from 30 Canadian water treatment works was undertaken. Liquid-liquid extraction, dynamic headspace and static headspace techniques were used. Chloroform and bromodichloromethane occurred most frequently in treated water. Trochloroethylene, benzene, toluene, tetrachloroethylene, dichloromethane, 1,2-dichloroethane, ethylbenzene and xylene occurred frequently in both treated and raw water.THM levles were lower in winter than summer.

?

Health and Welfare Canada

1982

******************************************************************************

WATER DECHLORINATION BY ACTIVATED CARBON, ULTRAVIOLET RADIATION AND SODIUM SULPHITE. A COMPARISON OF TREATMT SYSTEMS

GILES, M.A. ; DANELL, R.

FISHERIES AND OCEANS

Fisheries and Oceans

AL

Pilot-scale studies have been carried out on methods for the dechlorination of chlorinated tap water for use in experiments on fish; the results are summarized in tables and graphs, and discussed.

N/A

N/A

1983

WATER DEMAND MANAGEMENT

ROBINSON, JAMES E.

UNIVERSITY OF WATERLOO

University of Waterloo
Dept. of Man-Env. Studies
Waterloo Ontario
N2L 3G1

SURVEY

Evaluation using a systems approach of alternative management strategies than increasing supplies of water and wastewater treatment, to reduce total costs of wtaer and wastewater management.

$9,000.

Environment Canada

April 1/84 - March 30/85

******************************************************************************

WATER HARDNESS, HUMAN HEALTH AND THE IMPORTANCE OF MAGNESIUM

MARIER, J.R. ; NERI, L.C. ; ANDERSON, T.W.

NATIONAL RESEARCH COUNCIL

National Research Council

Ottawa Ontario

ELIAS

N/A

NRC

1979

**************************************************************************************

WATER QUALITY ANALYSIS OF NEARSHORE WATERS OF LAKE SIMCOE

KERR, DAVID

CUMMING-COCKBURN ASSOC.

Cumming-Cockburn Assoc.
145 Sparks Ave.
Willowdale Ontario
M2M 2S5

SURVEY

Analysis of the impact of stormwater runoff on potable water supply and swimming from Lake Simcoe. Study the effects of treated effluent on a water body.

$100,000.

Bertan Investment

December/1985

******************************************************************************

WATER QUALITY OF THE BOW RIVER: THE CHEMICAL MASS-BALANCE AND DEPLETION FACTOR APPROACH

TELANG, S.A.

UNIVERSITY OF CALGARY

University of Calgary

Calgary Alberta
T2N 1N4

SURVEY

$51,540.

A.E.R.T. - ALTA. ENV. RESEARCH TRUST

FISCAL 1983-85

********************************************************************************

WELL WATER SURVEY, CARLETON AND MADAWASKA COUNTIES

ECOBICHON, DONALD

N.B. DEPT. OF HEALTH

N.B. Department of Health
Carleton Place, P.O. Box 6000
Fredericton N.B.
E3B 5H1

SURVEY

Sampling of approximately 300 wells a total of four times during 1985. Objective is to determine quality of well water with respect to concentrations of Nitrate, Nitrite, Pesticides and bacteria.

$75,000.

N.B. Departmentof Health

April/1985 - March/1986

*******************************************************************************

WELLINGTON COUNTY WATER RESOURCE STUDY

FITZGIBBON, J.E.

UNIVERSITY OF GUELPH

University of Guelph
School of Rural Planning
Guelph Ontario
N1G 2W1

SURVEY

Monitoring of conditions and problems of rural water supplies in Wellington County.

$7,000.

Wellington Co. Planning Dept.

Octobert/1982 - October/1983

# APPENDIX I

# HEALTH RESEARCH ON DRINKING WATER IN CANADA

## INDEX OF RESEARCHERS

RESEARCHER PAGE(S):

ABERTNATHY, T. (84)
ALLEN, C. (112)
AITKEN, W. (123)
ANDERSON , G. (88, 153)
ANDERSON, T. (197)
ARMSTRONG, V. (26, 168)
ATWATER, J. (49)
AZZARIA, L. (131)
BADAKHSHAN, A. (119)
BAKER, B. (163)
BARBEAU, C. (25)
BECKING, G. (18, 161)
BEDARD, L. (20)
BENEDEK, A. (10, 176)
BENOIT, F. (48, 114, 122, 172)
BIERBRIER, A. (3)
BIGGS, D. (145)
BLEIWAS, A. (177)
BLOUW, A. (125)
BONNER, R. (155)
BOTHWELL, P. (2, 19, 44, 60, 181, 194)
BRIERE, F. (32)
BROOK, M. (106)
BROWN, D. (133)
BROWN, B. (152)
BROWN, W. (151)
BRYANT, D. (16)
BUNDOCK, J. (76)
BURGER, C. (33)
CAMPBELL, J. (177)
CHALIFOUX, C. (5, 150)
CHARLEBOIS, E. (62)
CHATFIELD, E. (4)
CHILIBECK, J. (169)

| | |
|---|---|
| CHOUDHRY, G. | (66) |
| CHU, I. | (13, 161) |
| CLARK, J. | (33, 143) |
| COHEN, D. | (16) |
| COMBA M. | (50, 175) |
| DANELL, R. | (195) |
| DAVID, E. | (41) |
| DAVIES, D. | (146) |
| DAVIES, K. | (111, 132, 177) |
| DAVEY, A. | (71, 128) |
| DAVIS, E. | (113, 149, 182) |
| DELMAGE, M. | (98) |
| DEMAYO, A. | (79, 180) |
| DESJARDINS, R. | (32) |
| DILON, M. | (4) |
| DOBSON, H. | (94) |
| DRAPEAU, A. | (20, 29, 135, 171) |
| DROSTE, R. | (148) |
| DUBUC, Y. | (32) |
| DUFOUR, J. | (96) |
| ECOBICHON, D. | (200) |
| ELSON, C. | (146) |
| FAST, D. | (81) |
| FITZGIBBON, J. | (201) |
| FORTIN, B. | (138) |
| FORESTALL, P. | (74) |
| FUNG, M. | (140) |
| GALINIER, J. | (99) |
| GALLOP, R. | (15) |
| GARTNER, J. | (126) |
| GATES, W. | (74) |
| GILES, M. | (195) |
| GOLDING, D. | (68) |
| GOSSELIN, F. | (29) |
| GOUGH, G. | (115) |
| GOURGON, D. | (134) |
| GRAHAM, J. | (76) |
| GRANTHAM, D. | (74) |
| GRIMARD, M. | (18) |
| GYSI, M. | (173) |

HALL, K. (164)
HARDIN, M. (34)
HARGESHEIMER, E. (129)
HARRINGTON, T. (162)
HARRISON, A. (109)
HAXRA, A. (34)
HAYES, E. (146)
HEINKE, G. (56)
HICKMAN, J. (18)
HILL, A. (187)
HODSON, P. (180)
HOHANSEN, H. (36)
HOLLIDAY, M . (168)
HRUDEY, S. (101, 184)
HUNSINGER, R. (39, 118)
HUNT, C. (89)
ISACC-RENTON, J. (45)
JACKSON, R. (95)
KAISER, K. (50)
KASATIYA, S. (20, 29)
KATZ, M. (37)
KAY, C. (64)
KAY, G. (24)
KERR, D. (198)
KHAN, T. (95)
KING-COLLIER, M. (77)
KOWBEL, D. (107, 162)
KROUSE, H. (183)
KUSHNER, D. (43)
KUTNEY, J. (157)
LAFRANCE, P. (32)
LANGFORD, C. (112, 185)
LAROSE, Y. (121)
LAWRENCE, J. (39, 80, 118, 175)
LAWRENCE, R. (29)
LEBEL, G. (7, 47, 48, 107, 122, 172)
LEE, E. (48)
LEE, P. (147, 178)
LEES, R. (85)
LEGGE, A. (174)
LETKEMAN, P. (8, 9, 11, 98)

LEWIS, P. (67)
LI, W. (95)
LINDSAY, J. (58)
LILIENTHAL, B. (142)
LOCKHART, W. (125)
LOCUERY, DR. A. (23)
LOMAX, P. (43)
LOUGH, R. (161)
LYE, J. (14)
MACKENZIE, A. (154)
MALAIYANDI, M. (6, 147)
MAO, Y. (22)
MARIER, J. (197)
MARTIN, R. (74)
MATATKO, M. (156)
MAY, S. (106)
MCCULLOUGH, R. (18, 60)
MCCURDY, R. (78, 82)
MCDONALD, R. (81)
MCGIRR, D. (130)
MCGREGOR, R. (134)
MCNEIL, E. (114)
MERANGER, J. (5, 17, 22, 53, 71, 95, 112, 127, 128, 150, 185)
MERESZ, O. (155)
METNER, D. (125)
MILLER, G. (187)
MORIN, P. (76)
MOSS, M. (82)
MOTT, J. (109)
MUIR, D. (125)
MURPHY, K. (181)
NAZAR, M. (106)
NEILSEN, G. (154)
NERI, L. (36, 144, 197)
NESTMANN, E. (48, 107, 162)
NGUYEN, P. (160)
NIELSEN, J. (101)
NORMANDIN, L. (55)
ODA, A. (42)
OGILVIE, D. (59)

O'GRADY, R. (6, 147)
OLIVER, B. (52, 80)
ONUSKA, F. (175)
OTSON, R. (2, 19, 27, 44, 48, 60, 114, 145, 181, 194)
PAYMENT, P. (61, 63, 72, 73, 83, 121, 136, 137, 193)
PEAKE, E. (35, 51)
PEARSON, N. (12, 144)
PIRON, D. (32)
PLANTE, R. (20, 63)
POTVIN, C. (131)
PROKOPUK, R. (34)
QUIGLEY, R. (40)
QUINN, M. (139)
QUON, T. (44)
RAMAN, S. (18)
RAMIA, S. (167, 186)
RAPSON, W. (106, 179)
RICE, R. (187)
ROBERTS, K. (39, 118)
ROBERTS, W. (39)
ROBERTSON, J. (42,181)
ROBERTSON, W. (1, 120)
ROBINSON, J. (196)
ROBSON, C. (187)
SABATINOS, L. (33)
SADANA, R. (46)
SADAR, M. (147)
SAMUELS, E. (127)
SATTAR, S. (167, 186, 190, 191)
SCHRECKER, T. (168)
SCHREIER, H. (97)
SCOTTEN, R. (156)
SECOURS, V. (13)
SEKLA, L. (64)
SEYHERS, B. (30)
SHAW, W. (54)
SHEAFF, N. (123)
SIMARD, G. (160)
SLAYMAKER, O. (21)

SMITH, D. (184)
SMITH, D. K. (58, 151)
SMITH-PALMER, T. (100)
SPENCE, M. (116)
STACKIW, W. (64)
STECHEY, D. (59)
STEELE, R. (85)
STROSHER, M. (183)
SUBRAHMANYAN, T. (192)
SUBRAMANIAN, K. (5, 17, 53, 112, 150, 185)
SUMARAH, R. (74)
SYLVESTRE, M. (69)
TALBOT, F. (36)
TARHANEN, J. (106)
TATE, R. (18, 60)
TAYLOR, K. (180)
TAYLOR, M. (79, 180)
TELANG, S. (170, 199)
THIRUMURTHI, D. (28)
TOBIN, R. (26, 43, 58, 74, 93)
TOFT, P. (22)
TOSINE, H. (175)
TRUDEL, M. (61, 63, 121)
TRUMP, G. (129)
UMBRASAS, R. (185)
VACHON, J. (158)
VAIRO, C. (95)
VAJIC, A. (124)
VANLOON, J. (102)
VANBUCKENHOUT, L. (64)
VIAU, A. (13)
VIJAN, P. (46)
VILLENEUVE, D. (13, 161)
VILLENEUVE, J. (70)
VLASSOFF, L. (143)
WALLIS, P. (86, 87, 103)
WAN, M. (57)
WEBSTER, G. (65, 75, 189)
WEINBERGER, P. (117)
WEST, R. (105)

WESTWOOD, J. (190)
WHITE, L. (116)
WIGLE, D. (22, 62)
WILLIAMS, D. (2, 6, 7, 19, 27, 44, 47, 48, 60, 107, 114, 122, 145, 172, 181, 194)
WILLIAMSON, D. (91)
WILSON, D. (57)
WOLFE, P. (74)
ZIKOVSKY, L. (99)

# APPENDIX II

## HEALTH RESEARCH ON DRINKING WATER IN CANADA

## INDEX OF RESEARCH INSTITUTIONS

| NAME | PAGE(S): |
|---|---|
| ADMIN. REG. DE KATIVIC | (32) |
| B. C. INSTITUTE OF TECHNOLOGY | (110) |
| BRANDON UNIVERSITY | (8, 9, 11, 98) |
| BRUCE A. BROWN ASSOCIATES | (152) |
| C. L. S. C. LAC ETCHEMIN | (55) |
| C. L. S. C. LOTBINIERE-OUEST | (76) |
| CADHAM PROVINCIAL LAB. | (64) |
| CALGARY HEALTH SERVICES | (84) |
| CANADIAN CENTRE FOR INLAND WATERS | (50, 52, 80, 175) |
| CANADIAN PUBLIC HEALTH ASSOCIATION | (3, 104) |
| CUMMING-COCKBURN ASSOCIATION | (198) |
| D. F. A. ENGINEERING LIMITED | (123) |
| DALHOUSIE UNIVERSITY | (78, 82, 142) |
| DEGREMONT LAING LIMITED | (44) |
| DEPARTMENT OF FISHERIES AND OCEANS | (16, 125, 195) |
| DEPARTMENT OF PUBLIC HEALTH, TORONTO | (111, 177) |
| ECOLE POLYTECHNIQUE DE MONTREAL | (20, 99) |
| ECOLE POLYTECHNIQUE | (135) |
| EDMONTON LOCAL BOARD OF HEALTH | (77) |
| ENVIRONMENT CANADA | (34, 57, 130) |
| ENVIRONNEMENT QUEBEC | (158) |
| FENCO CONSULTANTS LIMITED | (176) |
| GARTNER LEE ASSOCIATION LIMITED | (88, 126, 153, 178) |
| GRANDE PRAIRIE HEALTH UNIT | (139) |
| HEALTH AND WELFARE CANADA | (2, 4, 5, 6, 7, 13, 17, 19, 22, 26, 27, 43, 47, 48, 53, 58, 60, 62, 71, 93, 95, 107, 108, 112, 114, 122, 127, 128,134, 145, 147, 150, 151, 161, 162, 168, 172, 181, 185, 194) |
| I. E. C. INTERNATIONAL ENVIRONMENT CONSULTANTS | (92) |

I. E. C. BEAK CONSULTANTS (42)
INLAND WATERS DIRECTORATE (79, 180)
INRS-EAU (70)
INST. ARMAND FRAPPIER (61, 69, 72, 73, 83, 121, 136, 137,193)
INTERNATIONAL ENVIRONMENT CONSULTANTS (31)
JACOBS ENGINEERING GROUP (187)
MAN. DEPT. OF ENVIRONMENT (91, 133)
MCMASTER UNIVERSITY (10)
MIN. DES AFF. SOCIALES (29)
MINISTRY OF ENVIRONMENT (24, 33, 140, 155)
MINISTRY OF ENVIRONMENT, B. C. (115)
MOUNT ROYAL COLLEGE (129)
NATIIONAL WATER RESEARCH INSTITUTE (94)
NATIONAL RESEARCH COUNCIL (197)
NEW BRUNSWICK DEPARTMENT OF HEALTH (132, 200)
NORMAN PEARSON & ASSOCIATES (12)
NORTH EASTERN ALBERTA HEALTH (156)
NORTHERN COLLEGE (169)
NOVA SCOTIA DEPARTMENT OF HEALTH (38)
NOVA SCOTIA RESEARCH (1, 120)
ONTARIO MINISTRY OF ENVIRONMENT (14, 118, 124, 143, 165, 166)
ONTARIO MINISTRY OF HEALTH (192)
PORCUPINE HEALTH UNIT (138)
PROVINCE OF SASKATCHEWAN (81, 141)
PROVINCE OF ALBERTA (90)
PROVINCE OF BRITISH COLUMBIA (188)
QUEEN'S UNIVERSITY (85)
ROCHE ASSOCIES LIMITEE (159)
S. N. C. INC. (160)
SASKATCHEWAN HEALTH (105)
ST. FRANCIS XAVIER UNIVERSITE (100)
ST. MARY'S UNIVERSITY (146)
TECH. UNIVERSITY OF NOVA SCOTIA (28)
TEXAS A & M UNIVERSITY (109)
UNIVERSITE DU QUEBEC (63, 96)
UNIVERSITE LAVAL (25, 131)
UNIVERSITY OF ALBERTA (101, 184)
UNIVERSITY OF BRITISH COLUMBIA (21, 45, 49, 68, 97, 157, 164)

UNIVERSITY OF CALGARY (30, 35, 51, 54, 86, 87, 89, 103, 119, 163, 170,173, 174, 183, 199)
UNIVERSITY OF GUELPH (201)
UNIVERSITY OF LETHBRIDGE (67)
UNIVERSITY OF MANITOBA (15, 65, 66, 75, 189)
UNIVERSITY OF OTTAWA (18, 36, 117, 144, 148, 167, 186, 190, 191)
UNIVERSITY OF SASKATCHEWAN (41, 113, 149, 182)
UNIVERSITY OF TORONTO (56, 102, 106, 179)
UNIVERSITY OF WESTERN ONTARIO (40, 59)
UNIVERSITY OF WATERLOO (196)
UNIVERSITY OF WINNIPEG (23)
VICTORIA GENERAL HOSPITAL (74)
YORK UNIVERSITY (37)

POOR

QUALITY

ORIGINAL